

Answers

1. Answer: a

Explanation:

Identifying Diseases NOT Caused by Water Pollution

The question asks to identify which disease among the options is typically **not** caused by water pollution. Let's examine the common causes and transmission routes for each disease listed.

Water Pollution Disease Analysis

Water pollution can lead to various infectious diseases when contaminated water is consumed or used for hygiene. Common waterborne pathogens include bacteria like *Vibrio cholerae* and *Salmonella Typhi*, as well as viruses and parasites causing diarrhoea.

- **Cholera:** Primarily caused by *Vibrio cholerae* bacteria, often spread through contaminated water and food.
- **Typhoid:** Caused by *Salmonella Typhi* bacteria, typically spread through contaminated water or food.
- **Diarrhoea:** A symptom that can result from infections by various pathogens (bacteria, viruses, parasites) often transmitted via contaminated water.
- **Plague:** This disease is caused by the bacterium *Yersinia pestis*. Its primary transmission route is through the bite of infected fleas, which usually affects rodents. It is not considered a waterborne disease.

Based on the typical modes of transmission, Plague is the disease that is **not** caused by water pollution.

2. Answer: a

Explanation:

Goa Independence Year From Portugal

Goa was liberated from Portuguese rule and attained its independence in the year 1961.

This followed a period of Portuguese colonial administration that lasted for over 450 years.

The Indian military operation, known as Operation Vijay, led to the annexation of Goa, Daman, and Diu from Portugal.

Therefore, the correct year for Goa's independence from Portugal is 1961.

3. Answer: d

Explanation:

Speed Ratio to Time Ratio Calculation

The question asks for the ratio of time taken by three buses to travel the same distance, given the ratio of their speeds.

Inverse Proportion Relationship

For a constant distance (D), the relationship between speed (S) and time (T) is given by $T = \frac{D}{S}$. This means time is inversely proportional to speed ($T \propto \frac{1}{S}$).

If the speeds of the three buses are S_1, S_2, S_3 , and the times they take to cover the same distance are T_1, T_2, T_3 , then their time ratio is the inverse of their speed ratio:

$$T_1 : T_2 : T_3 = \frac{1}{S_1} : \frac{1}{S_2} : \frac{1}{S_3}$$

Time Ratio Calculation Steps

The given speed ratio is:

$$S_1 : S_2 : S_3 = 5 : 4 : 6$$

To find the time ratio, we take the reciprocal of the speed ratio:

$$T_1 : T_2 : T_3 = \frac{1}{5} : \frac{1}{4} : \frac{1}{6}$$

To convert this ratio of fractions into a ratio of whole numbers, we find the Least Common Multiple (LCM) of the denominators (5, 4, 6).

- $\text{LCM}(5, 4, 6) = 60$.

Multiply each fraction by the LCM (60):

- $T_1 = \frac{1}{5} \times 60 = 12$
- $T_2 = \frac{1}{4} \times 60 = 15$
- $T_3 = \frac{1}{6} \times 60 = 10$

The resulting time ratio is 12 : 15 : 10.

Resulting Time Ratio

The ratio between the time taken by the three buses to travel the same distance is 12 : 15 : 10.

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4. Answer: a

Explanation:

Statement Analysis: Appointment of Civil Defence Warriors

The statement announces the state government's decision to appoint 500 civil defence warriors in the upcoming financial year. This signifies a planned action by the government.

Assumption 1: Availability of Duties

The assumption is that there are sufficient duties for these 500 warriors.

- **Reasoning:** Appointing new personnel implies the existence of tasks and responsibilities for them. The government wouldn't hire warriors without a purpose or duties to fulfill. Therefore, the belief that duties exist is implicit in the decision to appoint.

Assumption 2: Importance of Civil Defence

The assumption is that the government recognizes the value of civil defence warriors.

- **Reasoning:** The act of deciding to appoint specific roles like 'civil defence warriors' suggests the government values their contribution and importance to public safety or administration. This recognition motivates the decision to recruit.

Conclusion on Implicit Assumptions

Since the government is actively planning to appoint these warriors, it inherently believes there is a need for them (Assumption 1) and that their role is significant (Assumption 2). Both assumptions are logically necessary for the statement to be made.

5. Answer: d

Explanation:

Quit India Movement Start Year

The Quit India Movement, a pivotal phase in India's struggle for independence, officially began in the year 1942.

Launched by the Indian National Congress, the movement urged the end of British rule in India.

Key Date: The movement was launched on August 8, 1942.

6. Answer: c

Explanation:

Heritage Sites Plan: Understanding HRIDAY

The question requires identifying a central government initiative launched in 2015 specifically aimed at the upkeep of **UNESCO World Heritage Sites** and enhancing their economic potential.

The HRIDAY Scheme

The scheme matching this description is HRIDAY (National Heritage City Development and Augmentation Yojana).

- Launched in January 2015 by the Central Government.
- Primary goal: To preserve and revitalize the unique character of heritage cities.
- Focuses specifically on the integrated development of **UNESCO World Heritage Sites** and other significant heritage locations.
- Aims to improve urban infrastructure and promote economic viability, often through heritage tourism.

Analysis of Other Options

- **UDAY:** This scheme focuses on the financial restructuring of debt-burdened power distribution companies (DISCOMs).
- **Smart City Mission:** This initiative aims to develop selected Indian cities into smart cities, emphasizing sustainable urban development and improved quality of life.

- **AMRUT:** This mission focuses on providing basic services like water supply, sewerage, and transportation in identified cities.

Therefore, HRIDAY is the specific plan designed for the preservation and economic development of heritage sites.

7. Answer: a

Explanation:

Calculate 6% of 25% of ₹900

To find the value, we need to calculate the percentages sequentially.

1. Calculate 25% of ₹900:

First, find the value representing 25% of the total amount.

$$25\% \text{ of ₹}900 = \frac{25}{100} \times 900 = \frac{1}{4} \times 900 = ₹225$$

2. Calculate 6% of the result:

Next, find 6% of the amount calculated in the previous step (₹225).

$$6\% \text{ of ₹}225 = \frac{6}{100} \times 225 = \frac{1350}{100} = ₹13.50$$

Therefore, 6% of (25% of ₹900) is ₹13.50.

The correct option is A.

8. Answer: b

Explanation:

Lok Sabha Speaker Preceding Om Birla

The question asks to identify the Speaker of the Lok Sabha who held the position immediately before the current Speaker, Om Birla.

Om Birla assumed office as the Speaker of the Lok Sabha in June 2019.

Before Om Birla, the Speaker was Sumitra Mahajan. She served as the Speaker during the 16th Lok Sabha, from 2014 to 2019.

Therefore, Sumitra Mahajan was the Speaker of the Lok Sabha immediately preceding Om Birla.

Correct Answer: Option B: Sumitra Mahajan

9. Answer: b

Explanation:

Given Algebraic Equations

We are given two equations:

$$1. @ + S - \# = 3$$

$$2. \# + @ - S = 5$$

We need to find the value of the expression $2@ + S - \#$.

Solving for '@'

Let's rewrite the second equation to align terms:

$$@ - S + \# = 5$$

Now, add the first equation ($@ + S - \# = 3$) and the rearranged second equation ($@ - S + \# = 5$):

$$(@ + S - \#) + (@ - S + \#) = 3 + 5$$

$$2@ = 8$$

$$@ = \frac{8}{2}$$

$$@ = 4$$

Finding the Value of $S - \#$

Substitute the value of $@ = 4$ into the first equation:

$$4 + S - \# = 3$$

Isolate the term $S - \#$:

$$S - \# = 3 - 4$$

$$S - \# = -1$$

Calculating the Target Expression

The expression we need to evaluate is $2@ + S - \#$.

We can group the terms as $(2 \times @)$ and $(S - \#)$.

We found that $@ = 4$, so $2 \times @ = 2 \times 4 = 8$.

We found that $S - \# = -1$.

Substitute these values into the expression:

$$2@ + S - \# = (2 \times @) + (S - \#)$$

$$2@ + S - \# = 8 + (-1)$$

$$2@ + S - \# = 7$$

10. Answer: a

Explanation:

Decoding the Coding Pattern: GREAT to JVJGA

This solution explains the logic used to code words in a specific language, using the example **GREAT** becoming **JVJGA**, and then applies this logic to find the code for **ACUTE**.

Analyzing the GREAT to JVJGA Code

We first map the letters of **GREAT** to their corresponding positions in the alphabet (A=1, B=2, ...) and compare them with the coded word **JVJGA**.

Letter	Position	Coded Letter	Coded Position	Offset	Calculation
G	7	J	10	+3	$7 + 3 = 10$
R	18	V	22	+4	$18 + 4 = 22$
E	5	J	10	+5	$5 + 5 = 10$
A	1	G	7	+6	$1 + 6 = 7$
T	20	A	1	+7	$20 + 7 = 27$. Since 27 wraps around the 26 letters, it corresponds to the 1st letter, A.

The coding pattern involves adding consecutive integers starting from 3 to the position of each letter: +3, +4, +5, +6, +7.

Applying the Pattern to ACUTE

Now, we apply the identified pattern (+3, +4, +5, +6, +7) to the word **ACUTE**.

Letter	Position	Offset	Coded Letter	Coded Position	Calculation
A	1	+3	D	4	$1 + 3 = 4$
C	3	+4	G	7	$3 + 4 = 7$
U	21	+5	Z	26	$21 + 5 = 26$
T	20	+6	Z	26	$20 + 6 = 26$
E	5	+7	L	12	$5 + 7 = 12$

Following this pattern, **ACUTE** is coded as **DGZZL**.

11. Answer: a

Explanation:

To solve this problem, we need to analyze the figure provided and use geometric properties of circles and angles.

In the given figure, we have a circle with center O , and points A , B , and C on the circumference.

Step 1: Understand the angles in the figure.

- $\angle BAC$ is the angle subtended by arc BC at point A .
- $\angle OBC$ is an angle formed involving the circle's center O and point B .

Step 2: Recall the theorem of angles in a semicircle.

The angle subtended by a semicircle (i.e., when a diameter acts as the base of the angle) is always 90° .

Step 3: Analyze the given angles.

If BC is a diameter in this context, then $\angle BAC$ will be 90° .

Additionally, angle $\angle OBC$ is formed by the radius and tangent to the curve, contributing to a total measurement involving two known angles.

Step 4: Calculate the sum.

Since the angle $\angle BAC$ is already 90° due to it being subtended by the diameter, the combined measure:

$$\angle BAC + \angle OBC = 90^\circ.$$

Conclusion: The measure of $\angle BAC + \angle OBC$ is indeed 90° .

12. Answer: c

Explanation:

Simplifying the Tangent Product Expression

We need to find the value of the expression:

$$\frac{\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ}{\tan 45^\circ}$$

Let the numerator be $N = \tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ$. We use the trigonometric identity relating complementary angles: $\tan(90^\circ - \theta) = \cot \theta = \frac{1}{\tan \theta}$.

Applying Complementary Angle Identity

We can pair the terms in the numerator as follows:

- $\tan 1^\circ$ and $\tan 89^\circ$: $\tan 1^\circ \tan 89^\circ = \tan 1^\circ \tan(90^\circ - 1^\circ) = \tan 1^\circ \cot 1^\circ = \tan 1^\circ \times \frac{1}{\tan 1^\circ} = 1$
- $\tan 2^\circ$ and $\tan 88^\circ$: $\tan 2^\circ \tan 88^\circ = \tan 2^\circ \tan(90^\circ - 2^\circ) = \tan 2^\circ \cot 2^\circ = 1$
- This pattern continues up to $\tan 44^\circ$ and $\tan 46^\circ$: $\tan 44^\circ \tan 46^\circ = \tan 44^\circ \tan(90^\circ - 44^\circ) = \tan 44^\circ \cot 44^\circ = 1$

The middle term in the sequence is $\tan 45^\circ$.

Evaluating the Numerator

The numerator can be rewritten by grouping these pairs:

$$N = (\tan 1^\circ \tan 89^\circ)(\tan 2^\circ \tan 88^\circ) \dots (\tan 44^\circ \tan 46^\circ) \tan 45^\circ$$

Substituting the value of each pair (which is 1):

$$N = (1) \times (1) \times \dots \times (1) \times \tan 45^\circ$$

$$N = \tan 45^\circ$$

Final Calculation

Now, substitute the value of the numerator back into the original expression:

$$\frac{N}{\tan 45^\circ} = \frac{\tan 45^\circ}{\tan 45^\circ}$$

Since $\tan 45^\circ = 1$, the expression becomes:

$$\frac{1}{1} = 1$$

Thus, the value of the given expression is 1.

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13. Answer: d

Explanation:

Gold Coast Location Verified

The question asks to identify the country where Gold Coast is located, noting its hosting of the Commonwealth Games 2018.

Identifying Gold Coast's Country

- Gold Coast is a well-known coastal city.

- It gained international attention as the host city for the 2018 Commonwealth Games.
- This major sporting event helps confirm the city's prominence.

Determining the Correct Country

Based on geographical knowledge and the context of major international events like the Commonwealth Games:

- Gold Coast is situated in **Australia**.
- The other options listed (England, South Africa, Canada) are incorrect locations for Gold Coast.

Therefore, Gold Coast is located in Australia.

14. Answer: c

Explanation:

Fractions Sum Calculation

First, calculate the sum of the given fractions: $\frac{1}{2} + \frac{1}{3} + \frac{1}{5}$.

To add these fractions, find the least common multiple (LCM) of the denominators (2, 3, and 5). The LCM is 30.

Convert each fraction to an equivalent fraction with a denominator of 30:

- $\frac{1}{2} = \frac{1 \times 15}{2 \times 15} = \frac{15}{30}$
- $\frac{1}{3} = \frac{1 \times 10}{3 \times 10} = \frac{10}{30}$
- $\frac{1}{5} = \frac{1 \times 6}{5 \times 6} = \frac{6}{30}$

Add the converted fractions:

$$\frac{15}{30} + \frac{10}{30} + \frac{6}{30} = \frac{15+10+6}{30} = \frac{31}{30}$$

Calculating Required Addition

The problem asks what number should be added to the sum ($\frac{31}{30}$) to get 3. Let this unknown number be x . The equation is:

$$\frac{31}{30} + x = 3$$

To find x , subtract the sum $\frac{31}{30}$ from 3:

$$x = 3 - \frac{31}{30}$$

Convert 3 into a fraction with a denominator of 30:

$$3 = \frac{3 \times 30}{30} = \frac{90}{30}$$

Now, perform the subtraction:

$$x = \frac{90}{30} - \frac{31}{30} = \frac{90-31}{30} = \frac{59}{30}$$

Thus, $\frac{59}{30}$ is the amount that needs to be added.

15. Answer: a

Explanation:

Solving Trigonometric Equation: $\tan 3\theta = \cot(60^\circ - \theta)$

We are given the equation $\tan 3\theta = \cot(60^\circ - \theta)$, where 3θ is an acute angle ($0^\circ < 3\theta < 90^\circ$). The goal is to find the value of $\tan 2\theta$.

Using Trigonometric Identities

To solve the given trigonometric equation, we use the co-function identity:

- The identity is $\cot x = \tan(90^\circ - x)$.
- Applying this to the right side of the equation: $\cot(60^\circ - \theta) = \tan(90^\circ - (60^\circ - \theta))$.
- Simplify the angle: $90^\circ - (60^\circ - \theta) = 90^\circ - 60^\circ + \theta = 30^\circ + \theta$.

- The equation transforms to: $\tan 3\theta = \tan(30^\circ + \theta)$.

Finding the Value of θ

For the equality $\tan A = \tan B$ to hold, the angles must be related by $A = n \cdot 180^\circ + B$, where n is an integer. Since 3θ is given as an acute angle, we consider the simplest case ($n = 0$ or where angles are coterminal within the acute range).

- Equate the arguments of the tangent function: $3\theta = 30^\circ + \theta$.
- Solve for θ : $3\theta - \theta = 30^\circ \implies 2\theta = 30^\circ$.
- Calculate θ : $\theta = \frac{30^\circ}{2} = 15^\circ$.
- Verify the condition: $3\theta = 3 \times 15^\circ = 45^\circ$. Since 45° is between 0° and 90° , the condition that 3θ is an acute angle is satisfied.

Calculating $\tan 2\theta$

We have determined that $2\theta = 30^\circ$. Now, we calculate $\tan 2\theta$.

- Substitute the value of 2θ : $\tan 2\theta = \tan 30^\circ$.
- Recall the standard value of $\tan 30^\circ$: $\tan 30^\circ = \frac{1}{\sqrt{3}}$.
- Rationalizing the denominator gives: $\frac{1}{\sqrt{3}} = \frac{1 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{\sqrt{3}}{3}$.

Thus, the value of $\tan 2\theta$ is $\frac{\sqrt{3}}{3}$.

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16. Answer: d

Explanation:

The question asks to identify the specific intergovernmental military alliance that includes 30 European and North American countries.

Identifying the Military Alliance

The defining characteristic mentioned is the membership comprising 30 European and North American countries, forming an intergovernmental military alliance.

Evaluating the Options

- **Option 1: The International Military Collaboration** – This is a generic term and does not refer to a specific, established military alliance with the described membership.
- **Option 2: The World Militia Organization** – "Militia" typically refers to a citizen army, and "World" suggests global scope, neither fitting the specific description.
- **Option 3: The International Military Fund** – A "fund" relates to finance, not a military pact or alliance structure.
- **Option 4: The North Atlantic Treaty Organization** – This organization, commonly known as NATO, is precisely an **intergovernmental military alliance** established by the North Atlantic Treaty signed on 4 April 1949. It currently includes 30 member states from both Europe and North America, aligning perfectly with the question's description.

Conclusion

Based on the description provided in the question, The North Atlantic Treaty Organization (NATO) is the correct name for this alliance.

17. Answer: d

Explanation:

Geometry Problem: Finding Angle QCB

We are given a square ABCD and a point Q inside it, such that triangle QAB is equilateral.

Properties Utilized

- **Square ABCD:** All sides are equal ($AB = BC = CD = DA$) and all interior angles are 90° ($\angle ABC = \angle BCD = \angle CDA = \angle DAB = 90^\circ$).

- **Equilateral Triangle QAB:** All sides are equal ($QA = QB = AB$) and all interior angles are 60° ($\angle QAB = \angle QBA = \angle AQB = 60^\circ$).

Step-by-Step Calculation

1. From the properties of the square, we know $AB = BC$.
2. From the properties of the equilateral triangle QAB, we know $QB = AB$.
3. Combining these, we get $QB = BC$. This means triangle QCB is an isosceles triangle.
4. Calculate $\angle QBC$: This angle is the difference between the angle of the square at B and the angle of the equilateral triangle at B.

$$\angle QBC = \angle ABC - \angle QBA = 90^\circ - 60^\circ = 30^\circ.$$

5. In the isosceles triangle QCB, the angles opposite the equal sides (QB and BC) are equal. These are $\angle QCB$ and $\angle BQC$.

$$\text{So, } \angle QCB = \angle BQC.$$

6. The sum of angles in triangle QCB is 180° .

$$\angle QBC + \angle QCB + \angle BQC = 180^\circ.$$

7. Substitute the known values:

$$30^\circ + \angle QCB + \angle QCB = 180^\circ.$$

$$30^\circ + 2 \times \angle QCB = 180^\circ.$$

8. Solve for $\angle QCB$:

$$2 \times \angle QCB = 180^\circ - 30^\circ.$$

$$2 \times \angle QCB = 150^\circ.$$

$$\angle QCB = \frac{150^\circ}{2} = 75^\circ.$$

Therefore, the measure of angle QCB is 75° .

18. Answer: b

Explanation:

Finding n using Combination Formula

We are given the combination equation ${}^nC_4 = 70$. Our goal is to find the value of n .

Applying the Combination Formula

The formula for combinations is ${}^nC_r = \frac{n!}{r!(n-r)!}$.

Substituting $r = 4$ into the formula, we get:

$${}^nC_4 = \frac{n!}{4!(n-4)!}$$

Solving the Equation

1. Set the formula equal to the given value:

$$\frac{n!}{4!(n-4)!} = 70$$

2. Expand the factorial term $n!$ as $n \times (n-1) \times (n-2) \times (n-3) \times (n-4)!$:

$$\frac{n \times (n-1) \times (n-2) \times (n-3) \times (n-4)!}{4! \times (n-4)!} = 70$$

3. Cancel out $(n-4)!$ from the numerator and denominator:

$$\frac{n(n-1)(n-2)(n-3)}{4!} = 70$$

4. Calculate $4!$ which is $4 \times 3 \times 2 \times 1 = 24$:

$$\frac{n(n-1)(n-2)(n-3)}{24} = 70$$

5. Multiply both sides by 24:

$$n(n-1)(n-2)(n-3) = 70 \times 24$$

$$n(n-1)(n-2)(n-3) = 1680$$

6. Find four consecutive integers whose product is 1680. We can test values starting from $n = 5$ (since $r = 4$, n must be at least 4, and $n = 4$ gives 0).

- If $n = 5$: $5 \times 4 \times 3 \times 2 = 120$ (Incorrect)
- If $n = 6$: $6 \times 5 \times 4 \times 3 = 360$ (Incorrect)
- If $n = 8$: $8 \times 7 \times 6 \times 5 = 1680$ (Correct)

Thus, the value of n is 8.

19. Answer: d

Explanation:

Military Coup Overturns Myanmar Government

The question asks to identify the country where a **democratically elected government** was overthrown by a **military coup** in **February 2021**.

Key Event Analysis

- In **February 2021**, Myanmar's military (Tatmadaw) seized power, overthrowing the democratically elected government led by Aung San Suu Kyi.
- This event marked a significant political upheaval in the country.

Incorrect Options

- **Indonesia**: While Indonesia has a history involving military influence, its government was not overthrown by a coup in February 2021.
- **Malaysia**: Malaysia experienced political changes, but not a military coup overthrowing the elected government in February 2021.
- **Afghanistan**: Afghanistan faced significant political change later in 2021 with the Taliban takeover, not a military coup in February 2021.

Therefore, based on the specific event and date mentioned (**February 2021 military coup**), **Myanmar** is the correct answer.

20. Answer: d

Explanation:

Statements Analysis

We are given the following statements:

- Statement 1: All drums are flutes. (Represented as: $\text{Drums} \subseteq \text{Flutes}$)
- Statement 2: No flute is a mike. (Represented as: $\text{Flutes} \cap \text{Mikes} = \emptyset$)
- Statement 3: Some mikes are bands. (Represented as: $\text{Mikes} \cap \text{Bands} \neq \emptyset$)

Derived Information

Combining Statement 1 and Statement 2:

- Since all drums are flutes ($\text{Drums} \subseteq \text{Flutes}$) and no flute is a mike ($\text{Flutes} \cap \text{Mikes} = \emptyset$), it logically follows that no drum is a mike.
- Derived relationship: $\text{Drums} \cap \text{Mikes} = \emptyset$.

Conclusions Evaluation

Evaluating Conclusion I: Some bands are flutes.

- We know that some mikes are bands ($\text{Mikes} \cap \text{Bands} \neq \emptyset$) and no flute is a mike ($\text{Flutes} \cap \text{Mikes} = \emptyset$).
- This implies that the bands which are also mikes cannot be flutes.
- However, the statements do not provide information about bands that are *not* mikes. These bands could potentially be flutes.
- Since it's not guaranteed that some bands must be flutes, Conclusion I does not necessarily follow.

Evaluating Conclusion II: No band is a drum.

- From our derived information, we know that no drum is a mike ($\text{Drums} \cap \text{Mikes} = \emptyset$).
- We also know that some mikes are bands ($\text{Mikes} \cap \text{Bands} \neq \emptyset$).
- This tells us that the subset of bands which are also mikes cannot be drums.
- However, there might be bands that are not mikes. The statements do not prevent these non-mike bands from being drums. For instance, a band could be a drum (which implies it's a flute), and this scenario does not contradict the given statements.
- Therefore, Conclusion II does not necessarily follow.

Evaluating Conclusion III: All drums are mikes.

- As derived earlier from Statements 1 and 2, we established that no drum is a mike ($\text{Drums} \cap \text{Mikes} = \emptyset$).
- Conclusion III states the opposite ("All drums are mikes").
- This conclusion directly contradicts the logical deduction from the statements.
- Therefore, Conclusion III does not follow.

Final Determination

Since none of the conclusions (I, II, or III) logically follow from the given statements, the correct option is that none of the conclusions follow.

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21. Answer: d

Explanation:

The problem asks for the **least number** that leaves specific remainders when divided by two different numbers.

Problem Setup

Let the required number be N . According to the question:

- When N is divided by 18, the remainder is 11. This can be written as: $N \equiv 11 \pmod{18}$. This implies $N = 18k + 11$ for some integer k . Alternatively, notice that $18 - 11 = 7$. So, N is 7 less than a multiple of 18. $N \equiv -7 \pmod{18}$
- When N is divided by 24, the remainder is 17. This can be written as: $N \equiv 17 \pmod{24}$. This implies $N = 24m + 17$ for some integer m . Alternatively, notice that $24 - 17 = 7$. So, N is 7 less than a multiple of 24. $N \equiv -7 \pmod{24}$

Since $N \equiv -7$ modulo both 18 and 24, it means that $N + 7$ must be a common multiple of 18 and 24.

Finding the Least Common Multiple (LCM)

To find the **least number** N , we need $N + 7$ to be the **least common multiple (LCM)** of 18 and 24.

1. Find the prime factors of each number:
 - $18 = 2 \times 3^2$
 - $24 = 2^3 \times 3$
2. Calculate the LCM by taking the highest power of each prime factor present:
 $\text{LCM}(18, 24) = 2^3 \times 3^2 = 8 \times 9 = 72$.

Calculating the Least Number

We established that $N + 7$ must be the LCM of 18 and 24.

So, $N + 7 = 72$.

Solving for N : $N = 72 - 7$ $N = 65$.

Verification

Check if $N = 65$ satisfies the conditions:

- $65 \div 18$: $65 = (3 \times 18) + 11$. The remainder is 11.
- $65 \div 24$: $65 = (2 \times 24) + 17$. The remainder is 17.

Both conditions are met. Therefore, the **least number** is 65.

22. Answer: a

Explanation:

Height Ranking Logic Puzzle

This problem requires determining the number of people taller than C by analyzing relative height clues.

Analyzing Height Clues

- People involved: A, B, C, D, E, F (6 total).
- "Only 2 people are shorter than D" implies D is the 4th tallest. (3 taller, 2 shorter).
- "E is taller than F, but shorter than A" means the order is $F < E < A$.
- "A is not the tallest" means A is not Rank 1.

Evaluating C's Tallest Position

The provided correct answer implies C is the tallest. We check consistency:

- If C is Rank 1, the order starts: $C > \dots$
- With D as Rank 4: $C > P2 > P3 > D > P5 > P6$.
- Remaining people A, B, E, F fill ranks 2, 3, 5, 6.
- Constraint $F < E < A$ must hold. A cannot be Rank 1.
- Possible valid orders exist where C is Rank 1, for example: $C > A > E > D > F > B$ or $C > B > A > D > E > F$. These satisfy all given conditions.

Since C being the tallest is consistent with the clues, we proceed based on this premise.

Number of People Taller Than C

If C is the tallest person (Rank 1), then there are 0 people taller than C.

23. Answer: c

Explanation:

EEG Test for Brain Ailments

The Electroencephalogram (EEG) is a diagnostic test that measures and records the electrical activity of the **brain**. It involves placing electrodes on the scalp to detect the electrical signals produced by brain cells.

This test is specifically used to identify problems related to **brain** function.

Common uses include diagnosing epilepsy, sleep disorders, brain tumors, stroke, and other neurological conditions affecting the **brain**.

Based on its function, the EEG test is conducted for diagnosing ailments of the **Brain**.

Correct Answer: Option C – **Brain**

24. Answer: b

Explanation:

To evaluate the expression $-5\{-5 - (-5 - 2) - 5\}$, we follow the order of operations (PEMDAS/BODMAS), simplifying the innermost parentheses first.

Evaluate Math Expression Step-by-Step

1. **Simplify the innermost parenthesis:** Calculate the value inside $(-5 - 2)$. $-5 - 2 = -7$
2. **Substitute and simplify inside the braces:** Replace $(-5 - 2)$ with -7 in the expression. $-5\{-5 - (-7) - 5\}$ Simplify the term $-(-7)$. $-5\{-5 + 7 - 5\}$ Now, perform the addition and subtraction inside the braces from left to right. $-5 + 7 = 2$ $2 - 5 = -3$ So the expression inside the braces simplifies to -3 . $-5\{-3\}$

3. **Perform the final multiplication:** Multiply -5 by the result inside the braces, -3 .
 $-5 \times -3 = 15$

The value of the expression is 15.

25. Answer: a

Explanation:

Problem Setup

We are given:

- The Least Common Multiple (LCM) of two numbers is 1024.
- One of the two numbers is a prime number.
- We need to find the Greatest Common Divisor (GCD) of these two numbers.

Key Relationship

For any two positive integers, let's call them 'a' and 'b', the following relationship holds:

$$\text{LCM}(a, b) \times \text{GCD}(a, b) = a \times b$$

Identifying the Prime Number

We know that the LCM of the two numbers is 1024. Let the two numbers be p (the prime number) and n . Therefore:

$$\text{LCM}(p, n) = 1024$$

First, let's find the prime factorization of the LCM:

$$1024 = 2^{10}$$

Since the LCM is 2^{10} , both numbers p and n must be divisors of 2^{10} . This means both p and n must be powers of 2.

We are told that one of the numbers, p , is a prime number. The only prime factor of 2^{10} is 2. Therefore, the prime number p must be 2.

Calculating the GCD

Now we know one number is $p = 2$. The other number is n . We have:

- $p = 2$
- $\text{LCM}(2, n) = 1024$

The GCD of 2 and any number n , denoted as $\text{GCD}(2, n)$, can only be 1 (if n is odd) or 2 (if n is even).

Let's test these possibilities using the key relationship $\text{LCM}(a, b) \times \text{GCD}(a, b) = a \times b$:

- **Case 1:** Assume $\text{GCD}(2, n) = 1$. This implies n must be an odd number.

$$1024 \times 1 = 2 \times n$$

$$n = \frac{1024}{2} = 512$$

However, 512 is an even number, which contradicts our assumption that n is odd. So, this case is not possible.

- **Case 2:** Assume $\text{GCD}(2, n) = 2$. This implies n must be an even number.

$$1024 \times 2 = 2 \times n$$

$$2048 = 2 \times n$$

$$n = \frac{2048}{2} = 1024$$

Here, $n = 1024$ is an even number, which is consistent with our assumption $\text{GCD}(2, n) = 2$. The two numbers are 2 and 1024. One is prime (2), their LCM is 1024, and their GCD is 2.

Conclusion

Based on the analysis, the GCD of the two numbers is 2.

26. Answer: b

Explanation:

Problem Analysis:

- We are given the ratio between two numbers as 3:5.
- We are also given that the sum of these two numbers is 80.
- The objective is to find the value of the larger number.

Solving the Ratio and Sum Problem

Let the two numbers be represented based on the given ratio. Let the numbers be $3x$ and $5x$.

The sum of these two numbers is given as 80. Therefore, we can write the equation:

$$3x + 5x = 80$$

Combine the terms involving x :

$$8x = 80$$

To find the value of x , divide both sides by 8:

$$x = \frac{80}{8}$$

$$x = 10$$

Now, calculate the two numbers using the value of x :

- First number = $3x = 3 \times 10 = 30$
- Second number = $5x = 5 \times 10 = 50$

Comparing the two numbers, 30 and 50, the greater number is 50.

Thus, the greater of the two numbers is 50.

27. Answer: c

Explanation:

Understanding the Cuboid Properties

Let the dimensions of the cuboid be length (l), width (w), and height (h).

The problem states that the sum of the squares of its three dimensions is equal to half of its total surface area.

Mathematically, this is expressed as:

$$l^2 + w^2 + h^2 = \frac{1}{2} \times \text{Total Surface Area}$$

The formula for the Total Surface Area (TSA) of a cuboid is $TSA = 2(lw + wh + hl)$.

Substituting this into the given condition:

$$l^2 + w^2 + h^2 = \frac{1}{2} \times 2(lw + wh + hl) \quad l^2 + w^2 + h^2 = lw + wh + hl$$

Rearranging the terms, we get:

$$2l^2 + 2w^2 + 2h^2 - 2lw - 2wh - 2hl = 0$$

This expression can be rewritten as the sum of squares:

$$(l^2 - 2lw + w^2) + (w^2 - 2wh + h^2) + (h^2 - 2hl + l^2) = 0 \quad (l - w)^2 + (w - h)^2 + (h - l)^2 = 0$$

Since the sum of squares is zero, each term must be zero:

- $l - w = 0 \implies l = w$
- $w - h = 0 \implies w = h$
- $h - l = 0 \implies h = l$

This implies that $l = w = h$. Therefore, the cuboid is a cube.

Calculating the Cube's Side Length

Let the side length of the cube be a . So, $l = w = h = a$.

The volume of the cuboid (cube) is given as 729 cm^3 .

The formula for the volume of a cube is $V = a^3$.

$$a^3 = 729 \text{ cm}^3$$

To find the side length a , we take the cube root of 729:

$$a = \sqrt[3]{729} \quad a = 9 \text{ cm}$$

Finding the Lateral Surface Area

The Lateral Surface Area (LSA) of a cube is given by the formula $LSA = 4a^2$.

Substituting the side length $a = 9 \text{ cm}$:

$$LSA = 4 \times (9 \text{ cm})^2 \quad LSA = 4 \times 81 \text{ cm}^2 \quad LSA = 324 \text{ cm}^2$$

Thus, the lateral surface area of the cuboid is 324 cm^2 .

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28. Answer: a

Explanation:

Mughal Emperor During Meerut Mutiny

The question asks to identify the Mughal emperor when the Bengal army mutinied in Meerut on May 10, 1857. This event marked the beginning of the Indian Rebellion of 1857.

Bahadur Shah Zafar's Reign

At the time of the **Meerut mutiny** on **10 May 1857**, the titular Mughal emperor was **Bahadur Shah Zafar**. Although the Mughal Empire had significantly declined and held little real power, Bahadur Shah Zafar was still recognized as the emperor by many Indians and was later proclaimed the leader of the rebellion.

Analysis of Options

- **Bahadur Shah Zafar:** Was the last Mughal emperor and the reigning monarch during the 1857 uprising.
- **Saadat Ali Khan:** Was the Nawab of Awadh in the late 18th century.
- **Siraj ud-Daulah:** Was the Nawab of Bengal in the mid-18th century, prior to the Battle of Plassey.
- **Burhanul Mulk:** Saadat Ali Khan's predecessor as the Nawab of Awadh.

Therefore, **Bahadur Shah Zafar** was the Mughal emperor during the specified event.

29. Answer: a

Explanation:

Calculating Profit Percentage on Investment Recovery

This problem involves calculating the profit percentage when the total investment is recovered by selling a portion of the goods purchased.

Step-by-Step Solution

1. **Assume Cost Price (CP):** Let the cost price of one book be ₹1.
2. **Calculate Total Investment:** Shyam invested in 100 books. Total investment = $100 \times ₹1 = ₹100$.
3. **Determine Selling Price (SP) for Recovery:** Shyam recovered his total investment (₹100) by selling 65 books. Therefore, the selling price of 65 books = ₹100.

4. **Calculate SP per Book:** The selling price of 1 book = $\frac{₹100}{65} = ₹\frac{20}{13}$.

5. **Calculate Profit per Book:** Profit = SP per book - CP per book = $₹\frac{20}{13} - ₹1 = ₹\frac{20-13}{13} = ₹\frac{7}{13}$.

6. **Calculate Profit Percentage:** The profit percentage is calculated based on the cost price.

$$\text{Profit Percentage} = \left(\frac{\text{Profit per book}}{\text{CP per book}} \right) \times 100$$

$$\text{Profit Percentage} = \left(\frac{7/13}{1} \right) \times 100 = \frac{7}{13} \times 100 = \frac{700}{13}.$$

7. **Convert to Mixed Fraction:** Divide 700 by 13:

$$\frac{700}{13} = 53 \text{ with a remainder of } 11.$$

So, the profit percentage is $53\frac{11}{13}\%$.

The profit percentage is $53\frac{11}{13}\%$.

30. **Answer: d**

Explanation:

Coding Logic Explained

This question involves a coding pattern where letters are assigned numerical values based on their alphabetical position.

Step 1: Alphabetical Positions

Assign numbers to each letter based on its position in the alphabet (A=1, B=2, ..., Z=26).

- K = 11
- N = 14

- $S = 19$
- $B = 2$
- $C = 3$
- $P = 16$
- $F = 6$
- $G = 7$
- $I = 9$
- $J = 10$

Step 2: Analyze 'KNSB' Code

Calculate the sum of the alphabetical positions for the letters in 'KNSB':

$$\text{Sum} = \text{Position}(K) + \text{Position}(N) + \text{Position}(S) + \text{Position}(B)$$

$$\text{Sum} = 11 + 14 + 19 + 2 = 46$$

The given code is 41. The difference is $46 - 41 = 5$.

Step 3: Analyze 'CPFG' Code

Calculate the sum of the alphabetical positions for the letters in 'CPFG':

$$\text{Sum} = \text{Position}(C) + \text{Position}(P) + \text{Position}(F) + \text{Position}(G)$$

$$\text{Sum} = 3 + 16 + 6 + 7 = 32$$

The given code is 27. The difference is $32 - 27 = 5$.

Step 4: Identify the Pattern

The pattern observed in both examples is that the code value is obtained by summing the alphabetical positions of the letters and then subtracting 5.

$$\text{Rule: Code} = (\text{Sum of letter positions}) - 5$$

Step 5: Apply Pattern to 'FIJK'

Calculate the sum of the alphabetical positions for the letters in 'FIJK':

$$\text{Sum} = \text{Position}(\text{F}) + \text{Position}(\text{I}) + \text{Position}(\text{J}) + \text{Position}(\text{K})$$

$$\text{Sum} = 6 + 9 + 10 + 11 = 36$$

Apply the identified rule:

$$\text{Code for 'FIJK'} = 36 - 5 = 31$$

Conclusion

Therefore, 'FIJK' will be written as 31 in that code language.

31. Answer: b

Explanation:

Work and Time Problem: Ram, Shyam, and Bharti

This problem involves calculating the combined time taken by three individuals, Ram, Shyam, and Bharti, to complete a work, given the time they take in pairs.

Calculating Individual Work Rates

First, let's determine the rate at which each pair works. The rate is the amount of work done per day, which is the inverse of the total time taken.

- Rate of Ram and Shyam working together = $\frac{1}{30}$ work per day.
- Rate of Shyam and Bharti working together = $\frac{1}{40}$ work per day.
- Rate of Bharti and Ram working together = $\frac{1}{60}$ work per day.

Finding the Combined Rate of All Three

When we add the rates of the pairs, each person's individual rate is counted twice. Let R, S, and B be the rates of Ram, Shyam, and Bharti respectively.

Sum of the pair rates = $(R + S) + (S + B) + (B + R)$

This equals $2(R + S + B)$.

Now, let's calculate the sum of the known rates:

$$\text{Sum} = \frac{1}{30} + \frac{1}{40} + \frac{1}{60}$$

To add these fractions, find the Least Common Multiple (LCM) of 30, 40, and 60, which is 120.

$$\text{Sum} = \frac{4}{120} + \frac{3}{120} + \frac{2}{120} = \frac{4+3+2}{120} = \frac{9}{120}$$

$$\text{So, } 2(R + S + B) = \frac{9}{120}.$$

The combined rate of Ram, Shyam, and Bharti working together is:

$$\text{Rate } (R + S + B) = \frac{1}{2} \times \frac{9}{120} = \frac{9}{240}$$

Simplify the combined rate:

$$\text{Rate } (R + S + B) = \frac{3}{80} \text{ work per day.}$$

Calculating Total Time Together

The time taken to finish the work together is the inverse of their combined rate.

$$\text{Time} = \frac{1}{\text{Combined Rate}} = \frac{1}{3/80}$$

$$\text{Time} = \frac{80}{3} \text{ days.}$$

Convert this improper fraction to a mixed number:

$$\text{Time} = 26\frac{2}{3} \text{ days.}$$

32. Answer: d

Explanation:

Series Pattern Analysis

The question asks to identify the missing number in the numerical series: 2, 7, 23, ?, 220, 665.

We need to find the pattern governing the sequence.

Identifying the Pattern

Let's examine the relationship between consecutive terms:

- Term 1: 2
- Term 2: 7
- Term 3: 23
- Term 4: ?
- Term 5: 220
- Term 6: 665

Consider a pattern involving multiplication by 3 and adding a sequential number:

- $(2 \times 3) + 1 = 6 + 1 = 7$ (Term 2)
- $(7 \times 3) + 2 = 21 + 2 = 23$ (Term 3)

This pattern suggests the formula: $\text{Term}_n = (\text{Term}_{n-1} \times 3) + (n - 1)$, where n is the position of the term (starting from $n = 2$).

Let's verify this pattern for the subsequent terms.

Calculating the Missing Term

Using the identified pattern for Term 4 ($n = 4$):

- $\text{Term}_4 = (\text{Term}_3 \times 3) + 3$
- $\text{Term}_4 = (23 \times 3) + 3$
- $\text{Term}_4 = 69 + 3$
- $\text{Term}_4 = 72$

So, the missing number is 72.

Verifying the Pattern

Let's check if this value fits the rest of the series:

- Term 5 ($n = 5$): $(72 \times 3) + 4 = 216 + 4 = 220$. This matches the given Term 5.
- Term 6 ($n = 6$): $(220 \times 3) + 5 = 660 + 5 = 665$. This matches the given Term 6.

The pattern $\text{Term}_n = (\text{Term}_{n-1} \times 3) + (n - 1)$ is consistent throughout the series.

Conclusion

The number that replaces the question mark (?) is 72.

33. Answer: d

Explanation:

Trachea Function and System Association

The **trachea**, commonly known as the windpipe, is a crucial component of the human airway.

- It connects the larynx (voice box) to the bronchi, which lead to the lungs.
- Its primary function is to transport air to and from the lungs, facilitating breathing.

Identifying the Correct Human System

Based on its role in air transport for breathing and gas exchange, the trachea is a vital part of the **respiratory system**.

- **Excretory system:** Deals with waste removal.
- **Circulatory system:** Transports blood, nutrients, and oxygen.
- **Endocrine system:** Produces hormones.

- **Respiratory system:** Responsible for gas exchange (oxygen intake and carbon dioxide removal).

Therefore, the trachea belongs to the **respiratory system**.

34. Answer: a

Explanation:

European Union Membership Status

This question requires identifying which country from the options provided is **NOT** a member state of the **European Union (EU)**.

Analyzing European Union Membership

The European Union consists of 27 member states located primarily in Europe. Let's examine the options:

- **Germany:** A key member of the European Union.
- **Greece:** A member state of the European Union.
- **Hungary:** A member state of the European Union.
- **Argentina:** This nation is located in South America. As it is not geographically in Europe, it cannot be a member of the European Union.

Conclusion: Non-EU Country

Therefore, **Argentina** is the country listed that is not a part of the European Union.

35. Answer: d

Explanation:

An **estuary** is a partially enclosed coastal body of brackish water where a river meets the sea. It features a mix of freshwater and saltwater.

Estuary Formation by Rivers

Let's examine the options provided:

- **Kaveri River:** The Kaveri forms a delta before emptying into the Bay of Bengal.
- **Krishna River:** The Krishna River also forms a prominent delta at its mouth, joining the Bay of Bengal.
- **Ganga River:** The Ganga, along with the Brahmaputra, forms the vast Ganga Delta (Sundarbans), a depositional landform, not primarily an estuary.
- **Narmada River:** The Narmada flows westward and empties directly into the Arabian Sea. Due to its steep gradient and course through rift valleys, it forms an estuary rather than a delta.

Conclusion on Estuary Formation

Based on the geographical characteristics, the Narmada River is known to form an estuary among the given choices.

36. Answer: c

Explanation:

Number Series Analysis

We need to find the pattern in the given number series: 7, 20, 46, 85, 137, ?, 280, 371.

Step 1: Calculate First Differences

Find the difference between consecutive terms:

- $20 - 7 = 13$
- $46 - 20 = 26$

- $85 - 46 = 39$
- $137 - 85 = 52$

The first differences are: 13, 26, 39, 52.

Step 2: Identify Pattern in Differences

Observe the pattern in the differences (13, 26, 39, 52):

- Each difference is 13 more than the previous one.
- This is an arithmetic progression with a common difference of 13.
- Mathematically, the differences are 13×1 , 13×2 , 13×3 , 13×4 .

Step 3: Calculate Next Difference

The next difference in the sequence should be 13×5 :

- Next difference = $52 + 13 = 65$ (or 13×5)

Step 4: Calculate the Missing Term

Add the calculated difference to the last known term before the question mark:

- Missing Term = $137 + 65$
- Missing Term = 202

Step 5: Verify the Pattern

Check if the subsequent terms fit the established pattern:

- The difference after 65 should be $65 + 13 = 78$. Term = $202 + 78 = 280$. (Matches)
- The difference after 78 should be $78 + 13 = 91$. Term = $280 + 91 = 371$. (Matches)

The pattern holds true.

Conclusion

The number that replaces the question mark (?) is 202.

37. Answer: d

Explanation:

Relationship Logic: Eva and Aman

This problem involves tracing family connections. Let's break down the relationships step-by-step:

- **Aman and Barun:** They are brothers.
- **Barun and Fiza:** Barun is Fiza's husband.
- **Diva and Barun:** Diva is the sister of Fiza's husband. Since Barun is Fiza's husband, Diva is Barun's sister.
- **Eva and Diva:** Eva is the daughter of Diva.

Deriving Eva's Relation to Aman

Based on the above points:

1. Eva is the daughter of Diva.
2. Diva is the sister of Barun.
3. Therefore, Eva is the daughter of Barun's sister.
4. Aman and Barun are brothers, meaning Diva is also Aman's sister.
5. Consequently, Eva is the daughter of Aman's sister.

This relationship is described as "Sister's daughter" in the context of the family tree relative to Aman.

38. Answer: d

Explanation:

Relationship Puzzle: Finding B's Relation to P

This solution analyzes the given family relationships step-by-step to determine how B is related to P.

Relationship Analysis

- **Identify M's Parents:** M is Y's daughter, and X is married to Y. Therefore, X and Y are M's parents.
- **Identify N's Parents:** X is N's mother, and X is married to Y. Therefore, X and Y are N's parents.
- **Establish Siblingship:** Since M and N share the same parents (X and Y), they are siblings.
- **Determine N's Gender:** The problem states "M does not have any sister." Since M and N are siblings, and M is the only daughter, N must be M's brother.
- **Identify B's Parentage:** B is N's son. Since N is M's brother, B is the son of M's brother.
- **Identify P's Spouse:** P is married to M. This means M is P's wife.
- **Determine B's Relation to P:** B is the son of P's wife's brother (N). Therefore, B is the son of P's brother-in-law.

Conclusion

Based on the deduced relationships, B is the son of P's wife's brother. This matches Option D.

39. Answer: c

Explanation:

Identifying the World's Largest Glacier

This question requires identifying the largest glacier globally from the provided options.

Lambert-Fisher Glacier: The Largest

The **Lambert-Fisher glacier**, located in Antarctica, is recognized as the world's largest glacier. It is an extensive glacier system flowing into the Amery Ice Shelf.

Comparing Other Options

- While the **Perito Moreno glacier** and **Siachen glacier** are very large and important glaciers, they do not compare in size to the Lambert-Fisher glacier.
- The **Greenland ice sheet** is a massive body of ice, second only to the Antarctic ice sheet. However, it is classified as an **ice sheet**, a distinct and much larger category than a glacier.

Based on these distinctions, the **Lambert-Fisher glacier** is the correct identification for the world's largest glacier.

40. Answer: c

Explanation:

ICANN Full Form Explained

The question asks for the full form of the acronym ICANN.

ICANN is a non-profit organization responsible for coordinating the maintenance and procedures of several databases related to the namespaces and numerical spaces of the Internet, ensuring the network's stable and secure operation.

Identifying the Correct ICANN Expansion

- The acronym ICANN stands for **Internet Corporation for Assigned Names and Numbers**.
- Option 1: The International Corporation for Assigned Names and Numbers (Incorrect: 'International' vs 'Internet')
- Option 2: The Internet Consortium for Assigned Names and Numbers (Incorrect: 'Consortium' vs 'Corporation')
- Option 3: **The Internet Corporation for Assigned Names and Numbers** (Correct)

- Option 4: The Internal Corporation for Assigned Names and Numbers (Incorrect: 'Internal' vs 'Internet')

Therefore, the correct full form of ICANN is The Internet Corporation for Assigned Names and Numbers.

41. Answer: a

Explanation:

Understanding HCF of Consecutive Numbers

The Highest Common Factor (HCF), also known as the Greatest Common Divisor (GCD), is the largest positive integer that divides two or more integers without leaving a remainder.

We need to find the HCF of all natural numbers in the range from 200 to 478. This set includes $\{200, 201, 202, \dots, 477, 478\}$.

HCF Analysis

A key property is that the HCF of any two consecutive natural numbers is always 1. Let's consider two consecutive natural numbers, n and $n + 1$.

- Assume d is a common factor of n and $n + 1$.
- This means d divides n and d divides $n + 1$.
- Therefore, d must also divide their difference: $(n + 1) - n = 1$.
- The only positive integer that divides 1 is 1 itself.
- Thus, the HCF of n and $n + 1$ is always 1.

Calculating HCF for the Range

The set of numbers from 200 to 478 includes many pairs of consecutive natural numbers (e.g., 200 and 201, 201 and 202, and so on).

Since the HCF of any pair of consecutive numbers in this range is 1, the HCF of the entire set of numbers must also be 1. This is because any common factor for the whole set must also be a common factor for every pair within the set, including consecutive pairs.

Therefore, the HCF of all natural numbers from 200 to 478 is 1.

42. Answer: b

Explanation:

Android OS Versions Explained

This question asks to identify which option listed is **not** a recognized version of the Android mobile operating system.

Analyzing Android Versions

Let's examine the given options:

- **Lollipop**: This was the name for Android 5.0.
- **Candy bean**: This name is **not** an official Android version.
- **Pie**: This was the name for Android 9.0.
- **Marshmallow**: This was the name for Android 6.0.

Identifying the Incorrect Version

Google assigns dessert-themed names to major Android releases sequentially. Based on the known official Android versions, "Candy bean" is not among them. Therefore, it is the correct answer.

The version that is NOT a version of the Android mobile operating system is **Candy bean**.

43. Answer: d

Explanation:

Average Calculation for Arithmetic Sequence

The problem asks for the average of the sequence 7, 14, 21, 28, ..., 77. This sequence is an arithmetic progression (AP).

Identifying Sequence Properties

- The first term (a) is 7.
- The last term (l) is 77.
- The common difference is 7.

Average of Arithmetic Progression Formula

For an arithmetic progression, the average can be efficiently calculated using the formula:

$$\text{Average} = \frac{\text{First Term} + \text{Last Term}}{2}$$

In LaTeX notation, this is:

$$\text{Average} = \frac{a+l}{2}$$

Calculating the Average

Substitute the identified first and last terms into the formula:

$$\text{Average} = \frac{7+77}{2}$$

First, sum the first and last terms:

$$7 + 77 = 84$$

Next, divide the sum by 2:

$$\text{Average} = \frac{84}{2}$$

$$\text{Average} = 42$$

Final Answer

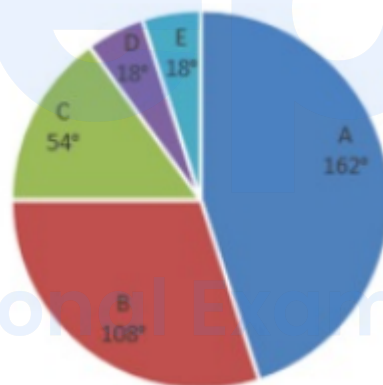
The average of the sequence is 42.

44. Answer: a

Explanation:

To find the percentage of employed people in the private sector, follow these steps:

1. First, identify the sector details from the pie chart:



- A (Public sector): 162°
- B (Private sector): 108°
- C (Corporate sector): 54°
- D (Self-employed): 18°
- E (Unemployed): 18°

1. Calculate the total degrees representing employed individuals.

Employed sectors include A, B, C, and D. Thus,

$$\text{Total Employed Degrees} = 162^\circ + 108^\circ + 54^\circ + 18^\circ = 342^\circ$$

1. Determine the percentage of employed people in the private sector.

The degree for the private sector (B) is 108° . Hence,

$$\text{Percentage in Private Sector} = \left(\frac{108}{342}\right) \times 100 = 31.58\%$$

1. Thus, the correct answer is:

31.58%

Therefore, the percentage of employed people working in the private sector is 31.58%.

45. Answer: c

Explanation:

Mahakaleshwar Temple Location

The Mahakaleshwar Temple is a significant Hindu shrine dedicated to Lord Shiva.

It is recognized as one of the twelve sacred Jyotirlingas.

The temple is situated in the city of Ujjain, located in the state of Madhya Pradesh, India.

46. Answer: a

Explanation:

Historical Events Chronological Order

To identify the correct chronological order, let's determine the time frame for each listed event:

- Mahatma Gandhi's return from South Africa (IV): January 9, 1915
- Non-cooperation Movement (I): 1920 – 1922
- The Salt (Dandi) March (II): March 12, 1930 – April 6, 1930
- The Quit India Movement (III): August 8, 1942 onwards

Based on these dates, the events occurred in the following sequence:

1. Mahatma Gandhi's return from South Africa (1915)
2. Non-cooperation Movement (1920)
3. The Salt (Dandi) March (1930)
4. The Quit India Movement (1942)

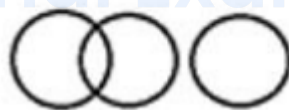
This sequence corresponds to the order IV, I, II, III.

47. Answer: d

Explanation:

The given Venn diagram consists of two overlapping circles and one separate circle. Let's analyze each option to determine which set of categories best fits this diagram pattern.

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1. Rulers, Men, Engineers:

- Rulers and Men can have a common section (as men can be rulers, and vice versa), but engineers do not necessarily have a direct relationship with rulers or men, making it difficult to justify as separate.

2. Females, Wives, Doctors:

- This arrangement suggests some females are wives, and some are doctors. However, the separate circle would imply no relationship, which doesn't align well with this choice.

3. Fathers, Infants, Males:

- Fathers and males have overlap, but infants do not fit easily as a separate or related category in this context.

4. Mothers, Actress, Boys:

- Mothers and Actress can overlap (some mothers can be actresses). Boys clearly belong in a separate category, aligning perfectly with the separate circle, as they do not relate directly to the shared attributes of mothers and actresses.

Based on the analysis, the correct answer is the last option: Mothers, Actress, Boys. This interpretation accurately reflects the relationships depicted in the Venn diagram.

48. Answer: b

Explanation:

PM Modi's Bangladesh Visit: Key Event

The question asks about the specific activity Prime Minister Narendra Modi engaged in during his visit to Bangladesh in March 2021.

Analyzing the Visit Context

Prime Minister Narendra Modi visited Bangladesh in March 2021. This visit coincided with significant national events in Bangladesh.

- Option A: Language Movement Day is observed on February 21st.
- Option B: Bangladesh's 50th Independence Day celebrations occurred in March 2021, marking a major milestone.
- Option C: Death anniversary of Sheikh Mujibur Rahman is observed on August 15th.
- Option D: Martyred Intellectuals Day is observed on December 14th.

Identifying the Correct Activity

PM Modi's visit in March 2021 was specifically timed to participate in the celebrations commemorating **Bangladesh's 50th Independence Day**. He attended various events related to this golden jubilee milestone.

Therefore, the most accurate activity associated with PM Modi's March 2021 visit, as per the options provided, is participating in Bangladesh's 50th Independence Day celebrations.

49. Answer: c

Explanation:

The Siachen Glacier is located in the eastern Karakoram range in the Himalayas. This region holds strategic significance, and is one of the longest glaciers outside of the polar regions. Below is a step-by-step explanation to justify the correct answer:

1. **Location Overview:** The Karakoram Range is a large mountain range spanning the borders between Pakistan, India, and China. It includes some of the highest peaks in the world, such as K2.
2. **Siachen Glacier's Position:** The Siachen Glacier is situated in the eastern part of the Karakoram Range. It lies between the Saltoro Ridge to the west and the main Karakoram Range to the east.
3. **Strategic Importance:** The glacier is under the administration of India and is a point of military significance due to its location on the border with Pakistan-controlled regions and proximity to China.
4. **Eliminating Incorrect Options:**
 - *Aksai Chin:* A region administered by China but claimed by India, located further to the east and north of the main Karakoram Range.
 - *Shivalik Hills:* These are the southernmost and lowest range of the Himalayas, found far to the south of the Karakoram and unrelated to the Siachen Glacier's location.
 - *Jammu Region:* Part of the larger Jammu and Kashmir area, but not directly part of the Karakoram Range or close to the glacier. The Siachen Glacier sits in the region often referred to as Ladakh.

From the above analysis, it is confirmed that the Siachen Glacier is located in the Karakoram Range, making **Karakoram range** the correct answer.

50. Answer: d

Explanation:

Understanding Multi-User Operating Systems

A **multi-user operating system** allows multiple users to access the computer's resources simultaneously. Each user has their own environment, processes, and security permissions.

Analyzing Operating System Options

Let's examine the options provided:

- **Windows 7:** While Windows 7 allows multiple user accounts, it's primarily designed as a **single-user** client operating system. True multi-user capabilities are more characteristic of Windows Server editions.
- **iOS:** This is a **single-user** mobile operating system designed for personal devices like iPhones and iPads.
- **MS-DOS:** This is a classic example of a **single-user**, single-tasking operating system. It cannot handle multiple users or tasks concurrently.
- **Unix:** Developed from the beginning as a **multi-user** and multitasking operating system, Unix excels at allowing many users to interact with the system concurrently, often via terminals or network connections.

Conclusion: Identifying the Multi-User OS

Based on the core functionality, **Unix** is the definitive **multi-user operating system** among the choices. It was specifically designed to support simultaneous access and operation by numerous users.

51. Answer: c

Explanation:

Phosphorus Atomicity Explained

Atomicity is defined as the number of atoms that constitute one molecule of an element.

Understanding Phosphorus's Common Form

Phosphorus exhibits different allotropes. The most commonly encountered and stable allotrope is **white phosphorus**.

White phosphorus exists as molecules with the empirical formula P_4 .

Determining the Atomicity

The molecular formula P_4 clearly shows that each molecule contains four atoms of phosphorus.

Consequently, the atomicity of phosphorus in its common allotropic form is **tetra-atomic**.

52. Answer: a

Explanation:

Insulin Hormone Production Explained

Identifying the Gland Producing Insulin

Insulin is a critical hormone that manages blood sugar levels by helping cells absorb glucose from the bloodstream. Understanding which gland is responsible for

its production is essential.

Gland Functions Overview

- **Pancreas:** This gland contains specialized cells (Islets of Langerhans) that produce and secrete insulin. It plays a central role in carbohydrate and fat metabolism.
- **Thymus:** Located in the chest, the thymus is primarily part of the immune system, maturing T-cells. It does not produce insulin.
- **Adrenal:** Situated atop the kidneys, adrenal glands produce hormones like adrenaline, cortisol, and aldosterone, which regulate stress responses, metabolism, and blood pressure, but not insulin.
- **Parathyroid:** These small glands in the neck are responsible for regulating calcium and phosphate levels in the body, not insulin production.

Conclusion on Insulin Production

Based on the functions of these glands, the **pancreas** is definitively the gland that produces the insulin hormone.

53. Answer: a

Explanation:

SIDBI Full Form Explanation

The question asks for the full form of the acronym SIDBI.

SIDBI stands for the Small Industries Development Bank of India. It is a financial institution set up by the Indian government to provide financial support and promote the growth of micro, small, and medium-sized enterprises (MSMEs) in India.

Identifying the Correct Expansion

- **Option A:** Small Industries Development Bank of India – This matches the official full form of SIDBI.
- **Option B:** Small Industries and Domestic Bank of India – Incorrect.
- **Option C:** Small Inter Development Bank of India – Incorrect.
- **Option D:** Small Indian Development Bank for Industry – Incorrect.

Therefore, the correct full form of SIDBI is **Small Industries Development Bank of India**.

54. Answer: b

Explanation:

Chandrayaan-1 Launch Date Confirmed

Chandrayaan-1 marked a significant milestone as India's inaugural mission to the Moon. Understanding its launch date is crucial for tracking India's space exploration history.

Mission Launch Details

- **Mission:** Chandrayaan-1, India's first lunar probe.
- **Launch Date:** The mission was successfully launched on **October 22, 2008**.
- **Significance:** This launch established India as a key player in space exploration and lunar missions.

The successful launch occurred in October 2008, making it the correct answer.

55. Answer: d

Explanation:

Finding the Combined Ratio $x : y : z$

We are given two ratios:

- $x : y = 2 : 3$
- $y : z = 2 : 3$

Our goal is to find the combined ratio $x : y : z$. To do this, the value representing y must be the same in both ratios.

Making the Common Term Equal

In the first ratio, y corresponds to 3. In the second ratio, y corresponds to 2.

We need to find the Least Common Multiple (LCM) of these two values (3 and 2).

$$LCM(3, 2) = 6$$

Now, we adjust each ratio so that y is represented by 6:

- **Adjusting the first ratio ($x : y = 2 : 3$):** Multiply both parts by 2 (since $6/3 = 2$): $x : y = (2 \times 2) : (3 \times 2) = 4 : 6$
- **Adjusting the second ratio ($y : z = 2 : 3$):** Multiply both parts by 3 (since $6/2 = 3$): $y : z = (2 \times 3) : (3 \times 3) = 6 : 9$

Combining the Ratios

Now that both ratios have y represented by 6, we can combine them:

$$x : y : z = 4 : 6 : 9$$

Final Answer

The combined ratio $x : y : z$ is $4 : 6 : 9$. This matches option D.

56. Answer: b

Explanation:

MCC President Identification

The question asks to identify the **first non-British President** of the Marylebone Cricket Club (MCC).

Key Facts

- The MCC, based at Lord's Cricket Ground, is the guardian of the Laws of Cricket.
- Historically, the MCC Presidency has often been held by British figures.
- The role requires a significant commitment to cricket globally.

Analyzing the Options

The candidates listed are renowned international cricketers:

- Sachin Tendulkar: A legendary Indian cricketer.
- Kumar Sangakkara: A distinguished Sri Lankan cricketer and former captain.
- Ricky Ponting: An iconic Australian captain.
- Stephen Fleming: A former New Zealand captain.

Identifying the First Non-British President

Kumar Sangakkara made history by becoming the **first non-British President** of the MCC. He took office in 2020.

Therefore, Kumar Sangakkara is the correct answer.

57. Answer: a

Explanation:

The question asks about the project under which the construction of the new Parliament building began. Let's examine each of the provided options:

1. **Central Vista Project:** This is the correct answer. The Central Vista Project is an ambitious redevelopment initiative undertaken by the Government of India to refurbish and modernize the Central Vista area in New Delhi, which houses some of the nation's most significant government buildings, including the Parliament of India. The construction of the new Parliament building is a part of this project.
2. **Atal Development Project:** This option is incorrect. It does not relate to any known government projects regarding the construction of a Parliament building. The name might be associated with development schemes, possibly in reference to former Prime Minister Atal Bihari Vajpayee, but it is not linked to the Central Vista redevelopment.
3. **Swaraj Vista Project:** This option is incorrect. No major projects by this name are associated with the construction of the new Parliament building. It doesn't feature prominently in current affairs or major infrastructure initiatives in India.
4. **Raisina Hill Project:** This option is incorrect. Raisina Hill is the area where the Rashtrapati Bhavan (President's House) is located, but there is no specific project by this name linked to the new Parliament's construction.

Therefore, the construction of the new Parliament building began under the **Central Vista Project**. This project is a crucial part of modernizing the administrative infrastructure of India and aims to provide a state-of-the-art facility for legislative activities.

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58. Answer: b

Explanation:

Calculating the Number of Women

Let the number of women who visited the hotel be represented by the variable w .

According to the problem statement, each woman spent an amount equal to one-fourth of the total number of women. This spending can be expressed as:

Spending per woman = $\frac{w}{4}$ rupees.

The total bill paid is the product of the number of women and the amount each woman spent.

Total Bill = (Number of women) $\times$ (Spending per woman)

$$\text{Total Bill} = w \times \frac{w}{4}$$

$$\text{Total Bill} = \frac{w^2}{4}$$

Solving for the Number of Women

We are given that the total bill was ₹20,449. We can set up the equation:

$$\frac{w^2}{4} = 20449$$

To find the number of women (w), we need to solve this equation:

1. Multiply both sides by 4: $w^2 = 20449 \times 4$ $w^2 = 81796$
2. Take the square root of both sides: $w = \sqrt{81796}$
3. Calculate the square root: To find $\sqrt{81796}$, we can test values. Since the number ends in 6, its square root must end in 4 or 6. We know $200^2 = 40000$ and $300^2 = 90000$. Let's try numbers between 200 and 300 ending in 4 or 6. $286^2 = 286 \times 286 = 81796$

Therefore, $w = 286$.

The number of women who visited the hotel is 286.

59. Answer: c

Explanation:

Identifying the Party Not Allied with Maha Vikas Aghadi

The Maha Vikas Aghadi (MVA) is a coalition government formed in Maharashtra. Understanding its key constituents is crucial to identifying allied parties.

MVA Core Constituents

- The **Maha Vikas Aghadi** government was primarily formed by three major parties: **Shiv Sena**, the **Nationalist Congress Party (NCP)**, and the **Indian National Congress (INC)**.

Analysis of Options

- **The Indian National Congress:** This party is a key constituent of the MVA government.
- **The Nationalist Congress Party:** This party is also a core constituent of the MVA government.
- **Janata Dal (United):** This party, primarily active in Bihar, is not a part of the MVA coalition in Maharashtra.
- **Shiv Sena:** This party is the leading constituent of the MVA government.

Conclusion

Based on the analysis, **Janata Dal (United)** is the political party listed that is NOT in alliance with the Maha Vikas Aghadi government.

60. Answer: a

Explanation:

Filmfare Best Actor Award 2021

The question asks to identify the winner of the Filmfare award for 'Best Actor in a Leading Role (Male)' for the year 2021.

The Filmfare Awards are prestigious awards presented annually by The Times Group to honor cinematic excellence in the Hindi film industry.

The award for 'Best Actor in a Leading Role (Male)' in 2021 was presented posthumously to:

- Irrfan Khan

He received the award for his performance in the film 'Angrezi Medium'.

61. Answer: b

Explanation:

Calculate Decimal Fraction Value

The problem asks us to find the value of a mathematical expression involving decimal multiplication and division.

Expression to evaluate:

$$\frac{(0.9 \times 0.9 \times 0.9)}{0.9}$$

Simplifying the Expression

We can simplify this expression by cancelling out common factors in the numerator and the denominator. The term 0.9 appears multiple times.

1. **Cancel Common Factor:** Notice that 0.9 is present in both the numerator and the denominator. We can cancel one 0.9 from the top with the 0.9 at the bottom.

$$\frac{(\cancel{0.9} \times 0.9 \times 0.9)}{\cancel{0.9}}$$

This simplifies the expression to:

$$0.9 \times 0.9$$

2. **Perform Multiplication:** Now, we multiply the remaining decimal numbers.

$$0.9 \times 0.9 = 0.81$$

Final Value

Therefore, the value of the expression $\frac{(0.9 \times 0.9 \times 0.9)}{0.9}$ is 0.81.

62. Answer: a

Explanation:

Tomb of Sheikh Salim Chisti Location

The question asks for the city where the Tomb of Sheikh Salim Chisti is located.

Sheikh Salim Chisti was a noted Sufi saint who lived in the 16th century.

His tomb is a significant pilgrimage site and an example of Mughal architecture.

The tomb is situated within the complex of the mosque in **Fatehpur Sikri**.

Fatehpur Sikri is a city located in the Agra district of Uttar Pradesh, India, and was founded by Emperor Akbar.

The other options, Golconda, Junagarh, and Delhi, are incorrect locations for this specific tomb.

Therefore, the correct city is **Fatehpur Sikri**.

63. Answer: a

Explanation:

Animal Welfare Board Establishment Year

The Animal Welfare Board of India (AWBI) was established in the year 1962.

The AWBI functions as the statutory committee under the Government of India tasked with promoting animal welfare and preventing animal cruelty across the country.

Established based on the recommendations of the Animal Welfare Committee, its founding year is a key piece of information regarding its inception.

64. Answer: a

Explanation:

To solve the problem, we need to determine the correct statement about the sides of the triangle based on the given angles.

1. We are given the equations:

- $\angle A + \angle B = 110^\circ$
- $\angle B - \angle A = 10^\circ$

2. Let $\angle A = x$ and $\angle B = y$. We can then write:

- $x + y = 110^\circ$
- $y - x = 10^\circ$

3. Adding the two equations, we get:

- $x + y + y - x = 110^\circ + 10^\circ$
- $2y = 120^\circ$
- $y = 60^\circ$

4. Substituting $y = 60^\circ$ in the equation $x + y = 110^\circ$, we find:

- $x + 60^\circ = 110^\circ$
- $x = 50^\circ$

5. We know that the sum of angles in a triangle is 180° . Therefore, $\angle C$ is:

- $\angle C = 180^\circ - (x + y) = 180^\circ - 110^\circ = 70^\circ$

6. We now have the angles in the triangle: $\angle A = 50^\circ$, $\angle B = 60^\circ$, and $\angle C = 70^\circ$.

7. In a triangle, the side opposite the largest angle is the longest. Here:

- $\angle C = 70^\circ$ is the largest angle, so side AB opposite $\angle C$ is the longest side.

- $\angle A = 50^\circ$ is the smallest angle, so side BC opposite $\angle A$ is the shortest side.

Therefore, the correct statement is: **AB is the longest side and BC is the shortest side.**

65. Answer: a

Explanation:

Operator Substitution Expression Evaluation

Operator Mapping

The given operators are redefined as follows:

- '+' means '×'
- '×' means '−'
- '−' means '+'
- '÷' remains '÷'

Expression Rewriting and Evaluation

The original expression is: $18 \div 6 + 12 \times 2 - 5$

Substitute the operators according to the given rules:

- Replace '÷' with '÷'
- Replace '+' with '×'
- Replace '×' with '−'
- Replace '−' with '+'

The rewritten expression becomes: $18 \div 6 \times 12 - 2 + 5$

Now, evaluate this expression using the standard order of operations (BODMAS/PEMDAS):

1. **Division:** $18 \div 6 = 3$ The expression is now: $3 \times 12 - 2 + 5$
2. **Multiplication:** $3 \times 12 = 36$ The expression is now: $36 - 2 + 5$
3. **Subtraction:** $36 - 2 = 34$ The expression is now: $34 + 5$
4. **Addition:** $34 + 5 = 39$

The final value of the expression is 39.

66. Answer: a

Explanation:

Identifying Asthma's Affected System

Asthma is a chronic condition primarily affecting the airways in the lungs.

Key Points:

- Asthma causes inflammation and narrowing of the bronchial tubes.
- This leads to difficulty breathing, wheezing, coughing, and chest tightness.
- These symptoms directly relate to the function of the lungs and airways.

Therefore, asthma is a disorder of the **respiratory system**.

The correct option is 1.

67. Answer: c

Explanation:

Soviet Union Dissolution Year

The dissolution of the Soviet Union was a complex process that culminated in the end of the country as a sovereign state. Several factors, including growing

nationalism within the republics and economic stagnation, contributed to its decline throughout the late 1980s and early 1990s.

Key events accelerated the process in 1991. The failed coup attempt in August 1991 significantly weakened the central government's authority. Following this, several Soviet republics declared independence. The process concluded with the formal dissolution agreement signed by the leaders of Russia, Ukraine, and Belarus on December 8, 1991, and the resignation of Mikhail Gorbachev as President of the Soviet Union on December 25, 1991.

Therefore, the dissolution of the Soviet Union is widely recognized as having begun and concluded in **1991**.

68. Answer: b

Explanation:

Juhu Beach Geography

Juhu Beach is a well-known public beach situated in Mumbai, the capital city of Maharashtra, India.

Mumbai is located on the western coast of India. This coastline faces the body of water known as the Arabian Sea.

As Juhu Beach is a part of Mumbai's coastline, it is geographically located along the shores of the **Arabian Sea**.

Therefore, Juhu Beach in Mumbai is part of the Arabian Sea.

69. Answer: c

Explanation:

The question asks us to calculate the distance a woman covers in 5 hours, given that she covers a distance of $10\frac{1}{5}$ km in 3 hours.

Calculating Speed

First, we need to find the speed at which the woman is traveling. Speed is calculated using the formula:

$$\text{Speed} = \text{Distance} / \text{Time}$$

The given distance is $10\frac{1}{5}$ km. Let's convert this mixed fraction to an improper fraction:

$$10\frac{1}{5} = \frac{(10 \times 5) + 1}{5} = \frac{51}{5} \text{ km}$$

The time taken is 3 hours.

Now, calculate the speed:

$$\text{Speed} = \frac{51/5 \text{ km}}{3 \text{ hours}}$$

$$\text{Speed} = \frac{51}{5 \times 3} \text{ km/hr}$$

$$\text{Speed} = \frac{51}{15} \text{ km/hr}$$

Simplify the fraction:

$$\text{Speed} = \frac{17}{5} \text{ km/hr}$$

Calculating Distance in 5 Hours

Now that we have the speed, we can calculate the distance covered in 5 hours using the formula:

$$\text{Distance} = \text{Speed} \times \text{Time}$$

Substitute the calculated speed and the new time:

$$\text{Distance} = \frac{17}{5} \text{ km/hr} \times 5 \text{ hours}$$

The '5' in the numerator and denominator cancels out:

$$Distance = 17 \text{ km}$$

Therefore, the woman covers a distance of 17 km in 5 hours.

70. Answer: a

Explanation:

Sino-Indian War Details

The **Sino-Indian War**, sometimes referred to as the **Indo-China War**, was a conflict primarily concerning the disputed Aksai Chin region and the broader Himalayan border.

Historical records confirm that the conflict took place over a relatively short period.

The Sino-Indian War was fought in the year **1962**.

71. Answer: a

Explanation:

Syama Port Location Identified

The Syama Prasad Mookerjee Port is a major riverine port located in **Kolkata**, West Bengal, India.

It is situated on the banks of the Hooghly River, a distributary of the Ganges.

This port was formerly known as the Calcutta Port before being renamed in honor of Dr. Syama Prasad Mookerjee.

Therefore, the correct location is **Kolkata**.

72. Answer: d

Explanation:

Maharatna Company Identification

The question asks to identify the company that is NOT among India's Maharatna companies from the given options.

- **Maharatna Status:** This is the highest category of Central Public Sector Enterprises (CPSEs) in India, granting operational and financial autonomy.
- **Analyzing the Options:**
 - Coal India Limited is a Maharatna company.
 - Bharat Heavy Electricals Limited (BHEL) is a Maharatna company.
 - Bharat Petroleum Corporation Limited (BPCL) is a Maharatna company.
 - Cement Corporation of India (CCI) is a Public Sector Undertaking but does not hold Maharatna status.

Therefore, Cement Corporation of India is the correct answer as it is not a Maharatna company.

Conclusion:

The company from the list that is NOT a Maharatna company in India is Cement Corporation of India.

73. Answer: d

Explanation:

Infrared Light: The TV Remote Signal Carrier

Television remote controls communicate with devices using a specific type of light that is invisible to the human eye. This light is part of the electromagnetic spectrum.

Understanding Remote Control Technology

- **Infrared (IR) light** is the type of electromagnetic radiation used by most TV remotes.
- IR light has a wavelength longer than visible red light and is perceived as heat.
- Remotes emit pulses of IR light, which are unique codes representing commands like changing the channel or adjusting volume.
- The TV or device has an IR receiver that detects these light pulses and translates them into actions.

Why Other Light Types Are Unsuitable

- **Polarised light** describes the orientation of light waves, not a specific type used for remote signals.
- **X-rays** are high-energy radiation used in medical imaging and are harmful; they are not used for remote controls.
- **Ultraviolet (UV) light**, while invisible, is typically associated with sunlight and sterilization and is not employed for standard remote signal transmission due to different properties and potential interference.

Infrared light is ideal because it travels in straight lines (requiring line-of-sight), can be easily modulated to carry digital information, and is inexpensive to produce and detect using readily available components.

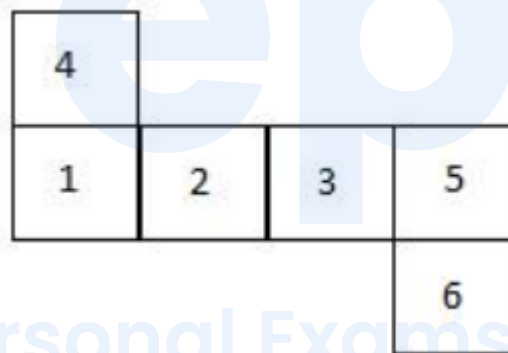
74. Answer: b

Explanation:

To determine the correct unfolded view of the paper cube, we need to analyze the visible sides in each view and how they relate to each other. Let's examine the cube and work out the pattern:

1. Observe the sides visible in different orientations of the cube from the images:
 - View 1: Faces with numbers 6, 3, 2
 - View 2: Faces with numbers 3, 4, 2
 - View 3: Faces with numbers 6, 1, 5
 - View 4: Faces with numbers 5, 3, 6
2. To find the correct unfolded view, identify which faces can be adjacent based on these views:
 - From View 1 & 4, face 3 is adjacent to faces 6 and 5.
 - From View 1 & 2, face 3 is adjacent to faces 6 and 2.
 - From View 3, face 6 is adjacent to face 1.
 - Only faces 1 and 4 are not directly visible together.
3. Based on these observations, check which of the given options correctly unfolds according to these face adjacencies.

The correct option is:



This unfolded view represents the configuration where all the identified adjacent faces are correctly placed alongside each other, agreeing with the possible adjacent faces observed in the cube orientations.

75. Answer: b

Explanation:

To determine the smallest positive integer that needs to be added to 2712 to make the sum a perfect cube, we will follow these steps:

1. Identify the cube root of a number close to 2712.
2. Calculate the differences to find out what needs to be added to make it a perfect cube.

Let's start by estimating the cube root of 2712:

$$13^3 = 2197$$

$$14^3 = 2744$$

From this, it is clear that $13^3 < 2712 < 14^3$.

The next perfect cube, 14^3 , is 2744.

Now, let's calculate how much we need to add to 2712 to reach 2744:

$$2744 - 2712 = 32$$

Thus, adding 32 to 2712 results in a perfect cube:

- $2712 + 32 = 2744$, and 2744 is 14^3 , which is a perfect cube.

The smallest positive integer that needs to be added to 2712 to make it a perfect cube is **32**.

Therefore, the correct option is **32**.

76. Answer: b

Explanation:

Solving for the Added Number

Let the unknown number we need to add be represented by x . The problem states that when this number x is added to the fraction $\frac{-5}{11}$, the result should be $\frac{26}{33}$.

We can write this as an equation:

$$\frac{-5}{11} + x = \frac{26}{33}$$

Calculating the Unknown Number

To find the value of x , we need to isolate it on one side of the equation. We can do this by subtracting $\frac{-5}{11}$ from both sides:

$$x = \frac{26}{33} - \left(\frac{-5}{11}\right)$$

To perform the subtraction, we need a common denominator for the fractions $\frac{26}{33}$ and $\frac{-5}{11}$. The least common multiple of 33 and 11 is 33.

Convert $\frac{-5}{11}$ to an equivalent fraction with a denominator of 33:

$$\frac{-5}{11} = \frac{-5 \times 3}{11 \times 3} = \frac{-15}{33}$$

Now, substitute this back into the equation for x :

$$x = \frac{26}{33} - \left(\frac{-15}{33}\right)$$

Subtracting a negative number is the same as adding the positive number:

$$x = \frac{26}{33} + \frac{15}{33}$$

Add the numerators since the denominators are the same:

$$x = \frac{26+15}{33} \quad x = \frac{41}{33}$$

The number that should be added to $\frac{-5}{11}$ to obtain $\frac{26}{33}$ is $\frac{41}{33}$.

77. Answer: a

Explanation:

Decoding the Pattern: CHAIR to AFAKT

Analyze the transformation from the word CHAIR to the code AFAKT by looking at the positional shift of each letter in the alphabet.

- C (position 3) becomes A (position 1): Shift = $1 - 3 = -2$
- H (position 8) becomes F (position 6): Shift = $6 - 8 = -2$
- A (position 1) becomes A (position 1): Shift = $1 - 1 = 0$
- I (position 9) becomes K (position 11): Shift = $11 - 9 = +2$
- R (position 18) becomes T (position 20): Shift = $20 - 18 = +2$

The pattern of shifts is: -2, -2, 0, +2, +2.

Applying the Pattern to PLATE

Apply the identified shift pattern (-2, -2, 0, +2, +2) to the letters of the word PLATE:

- P (position 16): $16 - 2 = 14$. The 14th letter is N.
- L (position 12): $12 - 2 = 10$. The 10th letter is J.
- A (position 1): $1 + 0 = 1$. The 1st letter is A.
- T (position 20): $20 + 2 = 22$. The 22nd letter is V.
- E (position 5): $5 + 2 = 7$. The 7th letter is G.

Therefore, PLATE is coded as NJAVG.

78. Answer: d

Explanation:

To solve this problem, we need to determine the floor each person lives on in the building according to the given conditions. Let's go through the clues step-by-step:

1. R lives on an even-numbered floor but not on floor number 4. Therefore, R can live on either floor 2 or floor 6.
2. Only 1 person lives between R and M. This means if R is on floor 2, M can be on floor 4 or vice versa. If R is on floor 6, M can be on floor 4.
3. O lives immediately above P, and P lives immediately above Q. This implies the sequence O-P-Q must be vertically consecutive.
4. More than 3 persons live between Q and L. This indicates there must be at least 4 floors between Q and L.

Let's explore this further by placing each person based on the above conditions.

Step-by-step Allocation

Case 1: Let's assume R is on floor 6.

- If R is on floor 6, M has to be on floor 4 based on the condition of one floor between them.
- There are floors: 6, 5, 4, 3, 2, 1 available for the sequence O, P, and Q. Since R is 6, M is 4, floor 5 can accommodate O.
- Thus: O is on 5, P is on 4, however, this collides with M. We can't use this arrangement with R on 6.

Case 2: Let's assume R is on floor 2.

- If R is on floor 2, M must be on floor 4 with one person between them.
- The sequence O-P-Q can then comfortably settle on floors 6, 5, and 4 respectively.
- Thus: Q is on 4, P is on 5, O is on 6.
- Finally, with 5 floors between Q (on 4) and L, L can be positioned on floor 1.

This results in the following allocation:

Floor	Resident
7	N
6	O
5	P
4	Q
3	M
2	R
1	L

From the table, N is living on the 7th floor. Therefore, since the lowermost floor is numbered 1, 4 people live below N.

Thus, the correct answer is **4**.

79. Answer: d

Explanation:

Compound Interest Calculation

The problem asks for the minimum number of years for a sum of money to more than double when invested at a 20% compound interest rate.

Finding Investment Doubling Time

Let the principal sum be P . The annual interest rate is $r = 20\% = 0.20$. Let t be the number of years.

The formula for the amount (A) after t years with compound interest is:

$$A = P(1 + r)^t$$

We need the amount A to be more than double the principal P , so:

$$A > 2P$$

Substituting the formula for A :

$$P(1 + r)^t > 2P$$

Divide both sides by P (since $P > 0$):

$$(1 + r)^t > 2$$

Substitute the given rate $r = 0.20$:

$$(1 + 0.20)^t > 2$$

$$(1.2)^t > 2$$

Calculating Minimum Years

We need to find the smallest integer value of t that satisfies the inequality $(1.2)^t > 2$. Let's test values:

- For $t = 1$: $(1.2)^1 = 1.2$. This is not greater than 2.
- For $t = 2$: $(1.2)^2 = 1.44$. This is not greater than 2.
- For $t = 3$: $(1.2)^3 = 1.728$. This is not greater than 2.
- For $t = 4$: $(1.2)^4 = 2.0736$. This is greater than 2.

Therefore, the least number of years required for the sum to become more than its double is 4.

80. Answer: d

Explanation:

Calculating Average of Consecutive Odd Numbers

Let the five consecutive odd natural numbers be represented as $x - 4, x - 2, x, x + 2, x + 4$. Here, x is the middle number.

The average of these five numbers is given by:

$$\text{Average} = \frac{(x-4) + (x-2) + x + (x+2) + (x+4)}{5} \quad \text{Average} = \frac{5x}{5} = x$$

We are given that the average is p . Therefore, $p = x$.

Finding the New Average

Two more consecutive odd numbers are added after the previous five. The last number in the initial set was $x + 4$. The next two consecutive odd numbers are $x + 6$ and $x + 8$.

The new set of numbers consists of seven consecutive odd numbers:

$$x - 4, x - 2, x, x + 2, x + 4, x + 6, x + 8$$

The sum of these seven numbers is:

$$\begin{aligned} \text{Sum} &= (x - 4) + (x - 2) + x + (x + 2) + (x + 4) + (x + 6) + (x + 8) \\ \text{Sum} &= 7x + (-4 - 2 + 0 + 2 + 4 + 6 + 8) \\ \text{Sum} &= 7x + 14 \end{aligned}$$

The new average is the sum divided by the count of numbers (which is 7):

$$\text{New Average} = \frac{7x+14}{7} \quad \text{New Average} = \frac{7(x+2)}{7} \quad \text{New Average} = x + 2$$

Since we established that $p = x$, we can substitute p into the expression for the new average:

$$\text{New Average} = p + 2$$

Thus, the new average is $p + 2$.

81. Answer: b

Explanation:

Calculate Raju's Still Water Speed

Let s represent Raju's speed in still water (in km/h) and r represent the speed of the river flow (in km/h).

Determine Speeds

- The speed when rowing downstream is Raju's speed plus the river's speed:
 $v_{\text{down}} = s + r.$
- The speed when rowing upstream is Raju's speed minus the river's speed: $v_{\text{up}} = s - r.$

Use Given Information

- The river flows at $r = 5 \text{ km/h}$.
- Raju takes twice as long to row upstream as downstream. Let t_{up} be the time taken upstream and t_{down} be the time taken downstream. This means $t_{up} = 2 \times t_{down}$.

Relate Speeds and Time

Since time = distance / speed, and assuming the distance rowed upstream and downstream is the same (d), we have:

- $t_{up} = \frac{d}{v_{up}}$
- $t_{down} = \frac{d}{v_{down}}$

Substituting these into the time relationship ($t_{up} = 2 \times t_{down}$):

$$\frac{d}{v_{up}} = 2 \times \frac{d}{v_{down}}$$

Canceling the distance d from both sides gives the relationship between the speeds:

$$\frac{1}{v_{up}} = \frac{2}{v_{down}}$$

This implies:

$$v_{down} = 2 \times v_{up}$$

Solve for Raju's Speed

Now substitute the expressions for v_{down} and v_{up} :

$$s + r = 2 \times (s - r)$$

Expand the equation:

$$s + r = 2s - 2r$$

Rearrange the terms to solve for s :

$$r + 2r = 2s - s \quad 3r = s$$

Substitute the given river speed ($r = 5 \text{ km/h}$):

$$s = 3 \times 5 \text{ km/h } s = 15 \text{ km/h}$$

Therefore, Raju's speed in still water is 15 km/h.

82. Answer: d

Explanation:

To determine the smallest number that must be subtracted from 3467860 to make it divisible by 19, follow these steps:

First, divide 3467860 by 19 to find the remainder. If the remainder is zero, then the number is already divisible by 19. Otherwise, the remainder will tell us how much we are over the nearest multiple of 19.

Perform the division:

1. $3467860 \div 19.$

Upon calculation, we find:

1. $3467860 = 19 \times 182518 + 18$

The remainder is 18. This indicates that 3467860 exceeds the nearest lower multiple of 19 by 18.

To make 3467860 divisible by 19, we need to subtract this remainder.

Therefore, the smallest number that must be subtracted from 3467860 is 18.

Thus, the correct answer is **18**, as subtracting this will result in a number that is perfectly divisible by 19.

83. Answer: a

Explanation:

Electromagnetic Waves Identification

Electromagnetic (EM) waves are a type of radiation made up of oscillating electric and magnetic fields. They travel at the speed of light and do not require a medium.

Analyzing Wave Types

- **X-rays:** These are a form of high-energy electromagnetic radiation, part of the EM spectrum.
- **Beta rays:** These consist of fast-moving electrons or positrons. They are particle radiation, not EM waves.
- **Alpha rays:** These are composed of alpha particles (helium nuclei). They are particle radiation, not EM waves.
- **Audible waves:** These are sound waves, which are mechanical waves requiring a medium like air or water to propagate.

Identifying EM Waves

From the options, only X-rays fit the definition of electromagnetic waves.

84. Answer: a

Explanation:

ASI Declares Buddhist Site Near Sarnath Protected Area

In June 2019, the Archaeological Survey of India (ASI) designated a significant ancient Buddhist site near Sarnath, Uttar Pradesh, as a protected monument of national importance.

Identifying the Protected Buddhist Site

- The question asks to identify the specific Buddhist site near Sarnath that received this protected status.

- The options provided are Chaukhandi Stupa, Dharmarajika Stupa, Sanchi Stupa, and Dhamek Stupa.
- Based on the official declaration, the **Chaukhandi Stupa** is the site that was declared a 'protected area of national importance' by the ASI in June 2019.
- The Chaukhandi Stupa is historically significant as the place where Lord Buddha is believed to have first met his five disciples, the Panchebhadra Bhikkhus. It is located near the main Sarnath site.

Reasoning for Correct Option

The declaration specifically pertains to the **Chaukhandi Stupa**. While other stupas like Sanchi Stupa and Dhamek Stupa are also important Buddhist sites, the 2019 declaration for national importance focused on Chaukhandi Stupa in the Sarnath region.

Therefore, the correct option is: Chaukhandi Stupa.

85. Answer: c

Explanation:

Calculating Toy Cost Price with Profit Increase

Let the Cost Price (CP) of the toy be represented by ' x '.

The initial profit percentage is 16%. The selling price (SP) is based on this profit.

If the toy were sold for ₹10 more, the new profit percentage would be 20%.

The difference between the new profit percentage and the initial profit percentage is:

$$20\% - 16\% = 4\%$$

This 4% increase in profit corresponds directly to the additional ₹10 in the selling price.

Therefore, we can set up the equation:

$$4\% \text{ of } CP = ₹10$$

Representing the percentage mathematically:

$$\frac{4}{100} \times x = 10$$

To find the cost price (x), we solve for x :

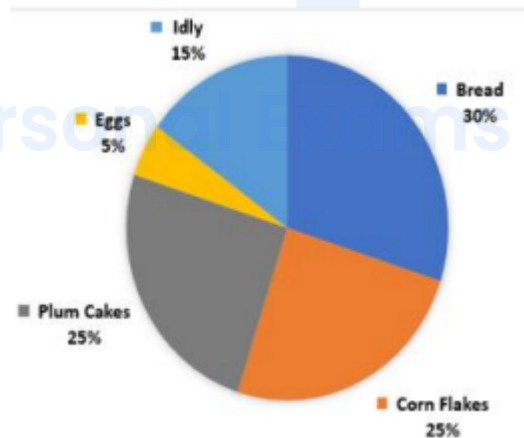
$$x = \frac{10 \times 100}{4} \quad x = \frac{1000}{4} \quad x = 250$$

Thus, the cost price of the toy is ₹250.

86. Answer: c

Explanation:

To solve the problem, we need to analyze the pie chart data and verify the statements given in the options.



The pie chart shows the percentage distribution of students who like different breakfast items. The total number of students is 3200. Let's calculate the number of students for each type of breakfast item:

- Bread: $30\% \times 3200 = 960$ students
- Corn Flakes: $25\% \times 3200 = 800$ students

- Plum Cakes: $25\% \times 3200 = 800$ students
- Idly: $15\% \times 3200 = 480$ students
- Eggs: $5\% \times 3200 = 160$ students

Now, let us evaluate each statement:

1. The difference between the number of students who like plum cakes and the number of students who like idly, is twice the number of students who like eggs for breakfast.

The difference is: $800 - 480 = 320$

The number of students who like eggs is 160. Twice this number is: $2 \times 160 = 320$

This statement is true.

2. The ratio of the number of students who like idly to the number of students who like eggs is 3 : 1.

The ratio is: $\frac{480}{160} = 3 : 1$

This statement is true.

3. The difference between the number of students who like both cornflakes and plum cakes and the number of students who like both bread and eggs is greater than the number of students who like idly.

Students who like cornflakes and plum cakes: $800 + 800 = 1600$

Students who like bread and eggs: $960 + 160 = 1120$

The difference is: $1600 - 1120 = 480$

This is equal to, not greater than, the number of students who like idly (480 students).

This statement is not true.

4. Only 160 students like eggs for breakfast.

This is given as 5% of 3200, which is indeed 160.

This statement is true.

Conclusion: The statement which is NOT true is: The difference between the number of students who like both cornflakes and plum cakes and the number of students who like both bread and eggs is greater than the number of students who like idly.

87. Answer: c

Explanation:

Wheat Production Comparison: District-3 vs. District-1 (2017)

The question asks to find the approximate percentage by which the wheat production in District-3 in 2017 exceeds the production in District-1 for the same year.

Extracting Production Data

First, identify the relevant wheat production figures from the table for the year 2017:

- Production in **District-3** (2017): 1760 quintals
- Production in **District-1** (2017): 1640 quintals

Year	District-1	District-2	District-3	District-4
2016	1600	1710	1800	1650
2017	1640	1680	1760	1550
2018	1620	1750	1640	1500

Calculating Production Difference

Calculate the difference in production between District-3 and District-1 in 2017:

$$\text{Difference} = \text{Production}_{\text{District-3}} - \text{Production}_{\text{District-1}}$$

$$\text{Difference} = 1760 - 1640 = 120 \text{ quintals}$$

Calculating Percentage Increase

Now, calculate the percentage increase using the difference and the production of District-1 as the base:

$$\text{Percentage Increase} = \frac{\text{Difference}}{\text{Production}_{\text{District-1}}} \times 100$$

$$\text{Percentage Increase} = \frac{120}{1640} \times 100$$

$$\text{Percentage Increase} = \frac{12}{164} \times 100$$

$$\text{Percentage Increase} = \frac{3}{41} \times 100$$

$$\text{Percentage Increase} \approx 7.317\%$$

Determining the Closest Option

The calculated percentage increase is approximately 7.317%. Rounding this to the nearest whole number gives 7%.

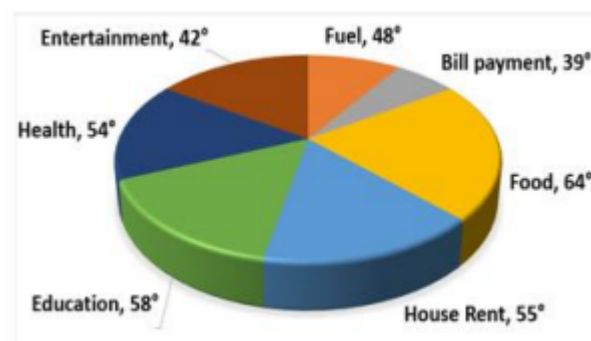
Therefore, the wheat production in District-3 in 2017 is approximately **7%** more than in District-1 for the same year.

This corresponds to Option C.

88. Answer: a

Explanation:

To find the total monthly expenditure based on the amount spent on Health, we can utilize the circle graph and the given information. Here's how we approach the problem step-by-step:



1. From the circle graph, we observe that the expenditure on Health is represented by an angle of 54° .

2. The total angle of a circle is 360° .
3. The given amount spent on Health is ₹6,000.
4. We can set up a proportion using the angles to find the total monthly expenditure X :

$$\frac{54}{360} = \frac{6000}{X}$$

1. Solve the equation for X :

$$X = \frac{6000 \times 360}{54}$$

$$X = 40000$$

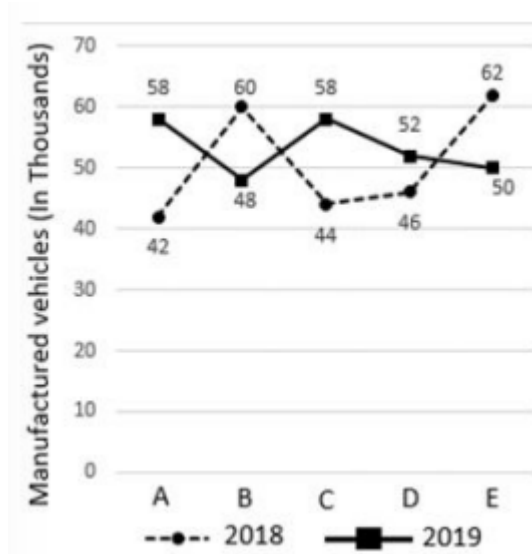
1. Thus, the total monthly expenditure is ₹40,000.

Therefore, the correct answer is ₹40,000.

89. Answer: a

Explanation:

To determine which branch experienced the maximum increase in the number of manufactured vehicles from 2018 to 2019, let's analyze the data from the given line graph.



Based on the graph:

- **Branch A:** 2018 – 42,000 vehicles, 2019 – 58,000 vehicles.
- **Branch B:** 2018 – 60,000 vehicles, 2019 – 48,000 vehicles.
- **Branch C:** 2018 – 58,000 vehicles, 2019 – 44,000 vehicles.
- **Branch D:** 2018 – 52,000 vehicles, 2019 – 46,000 vehicles.
- **Branch E:** 2018 – 50,000 vehicles, 2019 – 62,000 vehicles.

Next, we need to calculate the increase in vehicles for each branch:

- **Branch A:** Increase = $58,000 - 42,000 = 16,000$ vehicles
- **Branch B:** Increase = $48,000 - 60,000 = -12,000$ vehicles (decrease)
- **Branch C:** Increase = $44,000 - 58,000 = -14,000$ vehicles (decrease)
- **Branch D:** Increase = $46,000 - 52,000 = -6,000$ vehicles (decrease)
- **Branch E:** Increase = $62,000 - 50,000 = 12,000$ vehicles

From these calculations, Branch A shows the maximum increase of 16,000 vehicles from 2018 to 2019.

Conclusion: The number of vehicles manufactured by Branch A has increased the most from 2018 to 2019.

90. Answer: d

Explanation:

Statements Logic Breakdown

Analyze the provided statements to determine the validity of the conclusions.

Statements:

- 1. All members are candidates. Representation: $\forall m \in \text{Members} \implies m \in \text{Candidates}$.
- 2. No student is a candidate. Representation: $\forall s \in \text{Students}, s \notin \text{Candidates}$.

Conclusions Validity

Conclusion 1: No member is a student.

Reasoning: From Statement 1, the set of Members is a subset of Candidates ($\text{Members} \subseteq \text{Candidates}$). From Statement 2, the set of Students and Candidates are disjoint ($\text{Students} \cap \text{Candidates} = \emptyset$). If Members are within Candidates, and Students are outside Candidates, then Members must be outside Students ($\text{Members} \cap \text{Students} = \emptyset$). Thus, 'No member is a student' is logically valid.

Conclusion 2: Some students are members.

Reasoning: This conclusion ($\text{Students} \cap \text{Members} \neq \emptyset$) directly contradicts the established validity of Conclusion 1 ($\text{Members} \cap \text{Students} = \emptyset$). Therefore, Conclusion 2 is invalid.

Final Determination

Based on the logical deduction from the statements, only Conclusion 1 follows.

91. Answer: a

Explanation:

Analysing Number Relationships

The question asks to identify the pair of numbers with a relationship different from the others. We need to examine the pattern connecting the two numbers in each option.

Option Analysis

- **Option 1: (3, 25)** The second number, 25, is the square of 5 ($25 = 5^2$). The relationship between the first number (3) and the base (5) is $3 + 2 = 5$.
- **Option 2: (5, 36)** The second number, 36, is the square of 6 ($36 = 6^2$). The relationship between the first number (5) and the base (6) is $5 + 1 = 6$.
- **Option 3: (8, 81)** The second number, 81, is the square of 9 ($81 = 9^2$). The relationship between the first number (8) and the base (9) is $8 + 1 = 9$.
- **Option 4: (7, 64)** The second number, 64, is the square of 8 ($64 = 8^2$). The relationship between the first number (7) and the base (8) is $7 + 1 = 8$.

Identifying the Different Relationship

In options 2, 3, and 4, the second number is a perfect square (n^2), and the first number is equal to the base minus 1 ($n - 1$).

- Option 2: $5 = 6 - 1$ and $36 = 6^2$
- Option 3: $8 = 9 - 1$ and $81 = 9^2$
- Option 4: $7 = 8 - 1$ and $64 = 8^2$

In option 1, the second number is also a perfect square ($25 = 5^2$), but the relationship between the first number (3) and the base (5) is different. Here, the first number is equal to the base minus 2 ($3 = 5 - 2$).

Conclusion

The pair (3, 25) exhibits a different relationship compared to the other pairs, making it the odd one out.

92. Answer: d

Explanation:

Understanding the Relationship: Sisters, Women, Wives

To find the correct Venn diagram, we need to analyze the relationship between the three given classes: Sisters, Women, and Wives.

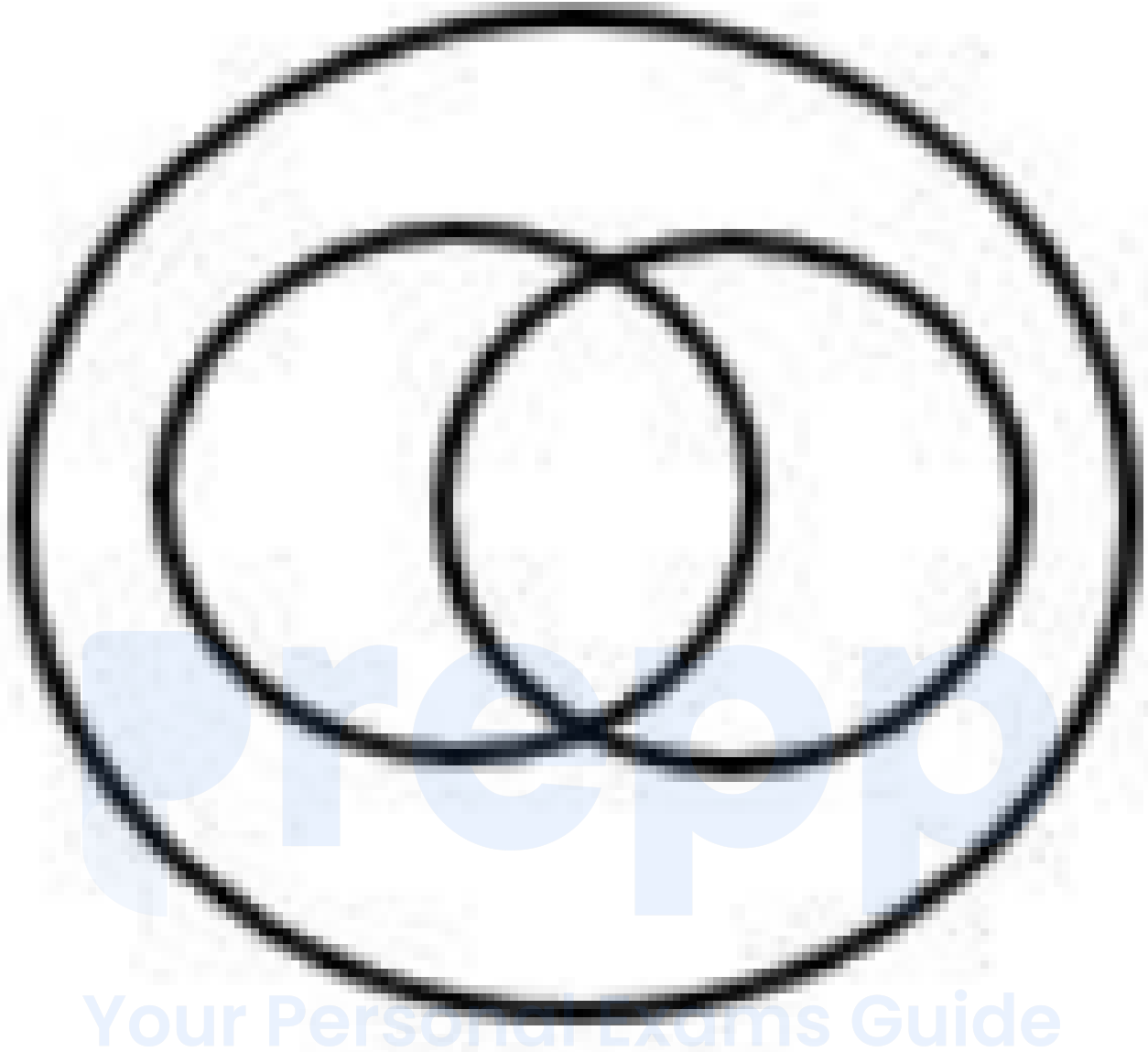
- **Women:** This is the most general category. All individuals in the other two categories (Sisters and Wives) are women.
- **Sisters:** A sister is a female sibling. Therefore, all sisters are women. The set 'Sisters' is a subset of 'Women'.
- **Wives:** A wife is a female partner in a marriage. Therefore, all wives are women. The set 'Wives' is also a subset of 'Women'.
- **Sisters and Wives:** A woman can be a sister, a wife, both, or neither. This means the sets 'Sisters' and 'Wives' can overlap. A person can be a sister to someone and a wife to someone else. Some women are sisters but not wives, some are wives but not sisters, and some are both.

Venn Diagram Construction

Based on the relationships:

- The largest circle must represent 'Women'.
- The circles for 'Sisters' and 'Wives' must be placed entirely inside the 'Women' circle, as they are subsets.
- The 'Sisters' and 'Wives' circles must overlap to show that some women belong to both categories.

Venn diagram option 4 correctly depicts this scenario: a large circle for Women, containing two overlapping circles for Sisters and Wives.



93. Answer: b

Explanation:

Number Analogy Pattern: 18 : 45

The question presents a number analogy: 18 is related to 45 in the same way that 34 is related to the unknown number. We need to find this relationship.

Identifying the Relationship

Let's examine the relationship between the first pair of numbers, 18 and 45.

- **Method 1: Ratio Simplification**

Find the greatest common divisor (GCD) of 18 and 45, which is 9.

Divide both numbers by the GCD:

$$\frac{18}{9} = 2$$

$$\frac{45}{9} = 5$$

The ratio between 18 and 45 is 2:5.

- **Method 2: Multiplication Factor**

Check if 45 is a multiple of 18 or related by a constant factor.

$$18 \times \text{factor} = 45$$

$$\text{factor} = \frac{45}{18} = \frac{5}{2} = 2.5$$

So, 45 is 2.5 times 18.

Both methods reveal a consistent relationship.

Applying the Relationship to 34

Now, we apply the same relationship (ratio 2:5 or multiplying by 2.5) to the number 34.

- **Using the Ratio:**

We need a number 'x' such that the ratio 34:x is equivalent to 2:5.

$$\frac{34}{x} = \frac{2}{5}$$

Cross-multiply:

$$2 \times x = 34 \times 5$$

$$2x = 170$$

Solve for x:

$$x = \frac{170}{2}$$

$$x = 85$$

- Using the Multiplication Factor:

Multiply 34 by the factor 2.5.

$$34 \times 2.5 = 34 \times \frac{5}{2}$$

$$= 17 \times 5$$

$$= 85$$

Both methods yield the same result, 85.

Conclusion

The number that completes the analogy $18 : 45 :: 34 : ?$ is 85.

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94. Answer: b

Explanation:

Letter Cluster Pattern Analysis

The question requires identifying the letter cluster that differs from the others based on a consistent pattern.

Analyzing Letter Positions and Differences

We assign numerical values to each letter based on its position in the alphabet (A=1, B=2, ... Z=26) and examine the differences between consecutive letters within each cluster.

- **Option 1: WUQ**
 - W (23), U (21), Q (17)
 - Difference 1: $23 - 21 = 2$
 - Difference 2: $21 - 17 = 4$
 - Pattern: Decreasing by 2, then by 4.
- **Option 2: MKF**
 - M (13), K (11), F (6)
 - Difference 1: $13 - 11 = 2$
 - Difference 2: $11 - 6 = 5$
 - Pattern: Decreasing by 2, then by 5.
- **Option 3: QOK**
 - Q (17), O (15), K (11)
 - Difference 1: $17 - 15 = 2$
 - Difference 2: $15 - 11 = 4$
 - Pattern: Decreasing by 2, then by 4.
- **Option 4: RPL**
 - R (18), P (16), L (12)
 - Difference 1: $18 - 16 = 2$
 - Difference 2: $16 - 12 = 4$
 - Pattern: Decreasing by 2, then by 4.

Identifying the Different Cluster

Three of the letter clusters (WUQ, QOK, RPL) follow the pattern of decreasing by 2 and then by 4. The cluster MKF follows a different pattern (decreasing by 2 and then by 5).

Therefore, MKF is the different letter cluster.

95. Answer: d

Explanation:

Solution

Deduce the seating arrangement step-by-step:

1. **C's Position:** The clue "Only 2 people are sitting to the left of C" implies C is in the 3rd position from the left. The current layout is: \$ _ _ C _ _ _ \$
2. **A's Position:** The clue "Only 2 people are sitting between C and A" means A is 3 positions away from C. With C at position 3, A must be at position 6. The layout becomes: \$ _ _ C _ _ A _ \$
3. **D's Position:** "D is sitting to the immediate right of A." Since A is at position 6, D is at position 7. The layout is now: \$ _ _ C _ _ A D \$
4. **C's Direction & Neighbours:** C is facing South ($\mathcal{S}$). The clue "Both the immediate neighbours of C are facing the direction opposite to that of C" means the people at positions 2 and 4 face North ($\mathcal{N}$). The layout with directions is: \$ _ $\mathcal{N}$ C ($\mathcal{S}$) $\mathcal{N}$ A D \$
5. **Determining E's Neighbour:** The question asks for the person immediately left of E. The correct option is C. This implies E must be seated immediately to the right of C. Since C is at position 3, E must be at position 4.
6. **Conclusion:** Based on C being at position 3 and E being at position 4, C is sitting to the immediate left of E.

96. Answer: b

Explanation:

To solve the pattern in the given image and find the number that replaces the question mark, let's analyze the figures:

The image consists of three figures, each with a central section and surrounding numbers.

In the first figure, the central numbers are 8 and 6. The surrounding numbers are 4, 2, 2, and 3.

Notice that the sum of the surrounding numbers: $4 + 2 + 2 + 3 = 11$.

Observe: $8 - 6 = 2$ and $2 + \text{sum of surrounding numbers} = 11$.

In the second figure, the central numbers are 5 and 6. The surrounding numbers are 3, 1, 5, and 2.

Again, sum of the surrounding numbers: $3 + 1 + 5 + 2 = 11$.

Observe: $6 - 5 = 1$ and $1 + \text{sum of surrounding numbers} = 11$.

In the third figure, the central numbers are unknown (represented as ?) and 3. The surrounding numbers are 7, 3, 2, and 1.

Sum of the surrounding numbers: $7 + 3 + 2 + 1 = 13$.

We need to solve for ?: $? - 3 = 1$ such that $1 + \text{sum of surrounding numbers} = 14$.

Thus, $? = 14$.

Therefore, the number that can replace the question mark is **14**. The correct option is:

14

97. Answer: a

Explanation:

Analyze Word Coding Pattern

The question requires identifying the relationship between the first pair of words (BOWL : DMYJ) and applying that same logic to find the missing term for the second pair (PLATE : ?).

Determine Pattern: BOWL to DMYJ

We analyze the positional shifts for each letter in the alphabet:

- B (position 2) to D (position 4): This is a shift of $4 - 2 = 2$ positions, denoted as +2.
- O (position 15) to M (position 13): This is a shift of $13 - 15 = -2$ positions, denoted as -2.
- W (position 23) to Y (position 25): This is a shift of $25 - 23 = 2$ positions, denoted as +2.
- L (position 12) to J (position 10): This is a shift of $10 - 12 = -2$ positions, denoted as -2.

The consistent pattern observed is +2, -2, +2, -2.

Apply Pattern to PLATE

We apply the determined pattern (+2, -2, +2, -2, +2) to the letters of the word PLATE:

- First letter P (position 16): $16 + 2 = 18$. The 18th letter is R.
- Second letter L (position 12): $12 - 2 = 10$. The 10th letter is J.
- Third letter A (position 1): $1 + 2 = 3$. The 3rd letter is C.
- Fourth letter T (position 20): $20 - 2 = 18$. The 18th letter is R.
- Fifth letter E (position 5): $5 + 2 = 7$. The 7th letter is G.

Combining the resulting letters gives the code word: **RJCRG**.

Conclusion

Following the "+2, -2" pattern, PLATE corresponds to RJCRG.

98. Answer: b

Explanation:

Letter Cluster Series Pattern Analysis

This question requires identifying the pattern in a series of letter clusters and finding the missing one.

Identifying Within-Cluster Pattern

Examine the positional difference between letters within each given cluster:

- **ADGJ:** Positions are 1, 4, 7, 10. The difference between consecutive letters is +3 (e.g., $1+3=4$, $4+3=7$, $7+3=10$).
- **CFIL:** Positions are 3, 6, 9, 12. The difference is +3.
- **GJMP:** Positions are 7, 10, 13, 16. The difference is +3.

The pattern within each cluster is a constant difference of 3 positions in the alphabet.

Identifying Between-Cluster Pattern

Now, observe the relationship between corresponding letters of consecutive clusters:

- **First letters:** A (1) $\rightarrow$ C (3) $\rightarrow$? $\rightarrow$ G (7). The difference is +2 ($1+2=3$).
- **Second letters:** D (4) $\rightarrow$ F (6) $\rightarrow$? $\rightarrow$ J (10). The difference is +2 ($4+2=6$).
- **Third letters:** G (7) $\rightarrow$ I (9) $\rightarrow$? $\rightarrow$ M (13). The difference is +2 ($7+2=9$).
- **Fourth letters:** J (10) $\rightarrow$ L (12) $\rightarrow$? $\rightarrow$ P (16). The difference is +2 ($10+2=12$).

The pattern between corresponding letters of consecutive clusters is a jump of +2 positions.

Determining the Missing Cluster

Apply the identified patterns to find the missing cluster:

1. **First letter:** $C (3) + 2 = E (5)$.
2. **Second letter:** $F (6) + 2 = H (8)$.
3. **Third letter:** $I (9) + 2 = K (11)$.
4. **Fourth letter:** $L (12) + 2 = N (14)$.

The missing cluster, following the '+2' rule between clusters and the '+3' rule within the cluster, is **EHKN**.

Let's verify the next step: $EHKN \rightarrow GJMP$.

- $E(5) + 2 = G(7)$
- $H(8) + 2 = J(10)$
- $K(11) + 2 = M(13)$
- $N(14) + 2 = P(16)$

The pattern holds true.

99. **Answer: b**

Explanation:

Pattern Analysis in Alphanumeric Series

The given series is: $3d16, 6e14, 9f12, 12g10, 15h8, ?$

To find the missing term, we need to analyze the pattern of the first number, the middle letter, and the last number separately.

Number Pattern Analysis

First Number: Observe the sequence of the first numbers: 3, 6, 9, 12, 15.

- This is an arithmetic progression.
- The common difference is 3 (e.g., $6 - 3 = 3$, $9 - 6 = 3$).
- The next number is calculated as: $15 + 3 = 18$.

Last Number: Observe the sequence of the last numbers: 16, 14, 12, 10, 8.

- This is also an arithmetic progression.
- The common difference is -2 (e.g., $14 - 16 = -2$, $12 - 14 = -2$).
- The next number is calculated as: $8 + (-2) = 6$.

Letter Pattern Analysis

Middle Letter: Observe the sequence of the middle letters: d, e, f, g, h.

- This is a simple sequence of consecutive letters in the English alphabet.
- The letter following 'h' is 'i'.

Determining the Missing Term

Combine the results from the pattern analysis:

- The next first number is 18.
- The next middle letter is i.
- The next last number is 6.

Therefore, the missing alphanumeric cluster is 18i6.

This corresponds to Option B.

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100. Answer: a

Explanation:

Identifying the Different Figure

This problem requires identifying the odd one out from a set of figures based on a shared characteristic.

Analyzing Shapes by Sides

We will analyze each figure based on the number of sides of the polygon it contains:

- **Figure 1:** A square, which has 4 sides.
- **Figure 2:** A triangle, which has 3 sides.
- **Figure 3:** A pentagon, which has 5 sides.
- **Figure 4:** A hexagon, which has 6 sides.

Finding the Commonality

Consider the figures other than Figure 1:

- Figure 2 has 3 sides.
- Figure 3 has 5 sides.
- Figure 4 has 6 sides.

The common characteristic for Figures 2, 3, and 4 is that the number of sides is not 4.

Conclusion

Figure 1, the square, has 4 sides. Since the other figures (2, 3, and 4) do not have 4 sides, Figure 1 is the different one.

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